

## BIRD CONSERVATION PLAN FOR THE LOWER GREAT LAKES/ST. LAWRENCE PLAIN BIRD CONSERVATION REGION (BCR 13)

*Vision Statement:*

*“Conservation planning that is integrated among bird initiatives and across borders to sustain or restore, at the landscape level, populations of all native birds and their habitats in the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region.”*



**Figure 1.** BCR 13 (shown in dark green). Adjacent BCRs shown in other colors.

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## CHAPTER 1

### OVERVIEW

#### *Purpose of this Plan*

This document is a conservation plan for all bird species in the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region, or **BCR 13** ([Figure 1](#)). This plan provides links to many existing conservation plans applicable to this area, and attempts to integrate them by describing the highest priority bird species and habitats overall, across all of the national, international, and regional bird plans that have been completed. This plan is the result of efforts from many different partners and stakeholders from four U.S. states and two Canadian provinces, who have contributed to this effort for more than five years and collectively represent the [BCR 13 Initiative](#).

#### *Goals & Objectives*

The goal of the BCR 13 Initiative is to build a strong biological foundation that enables effective and efficient conservation of habitat for migratory birds in the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region (BCR 13), through a coordinated international effort. This plan provides strategic guidance for implementing conservation actions across the region.

The objectives of this conservation initiative are to:

1. Determine the highest priority bird species and their habitat needs in this region;
2. Delineate focus areas and other geographic areas to help guide high priority conservation activities;
3. Develop population and habitat goals, if applicable, to sustain populations of priority species;
4. Identify priority research and monitoring needed to test assumptions underlying population and habitat objectives, identify limiting factors, assess population sizes or trends, and guide adaptive management activities;
5. Develop implementation strategies to deliver conservation actions that restore and sustain native bird populations in this region;
6. Coordinate implementation efforts, build partnerships, and communicate among local, state, provincial, and international stakeholders.

This plan accomplishes the first two objectives above, begins to address the fourth and fifth, and establishes a foundation with which to continue working on all the objectives. Developing, funding, and implementing priority research, monitoring, and habitat projects (e.g., protection, restoration, and management), and measuring success toward population and habitat goals in an adaptive management framework are long-term goals of BCR 13 partners.

#### *BCR planning within the NABCI framework*

Conservation planning for migratory birds has progressed rapidly since the signing of the North American Waterfowl Management Plan ([NAWMP](#)) by the U.S. and [Canada](#) in 1986. NAWMP identified priority species in terms of conservation concern and importance to harvest, set continental population and/or habitat objectives for waterfowl, and identified geographic areas of importance in which to focus conservation effort. Since NAWMP started, three continental (or dual national) initiatives began to plan in parallel to conserve other bird groups, including landbirds ([Partners in Flight](#)), waterbirds ([Waterbird Conservation for the Americas](#) and [Wings over Water](#)), and shorebirds ([U.S.](#) and [Canadian Shorebird Conservation Plans](#)). Like NAWMP, all these plans attempted to estimate

bird populations and set population and/or habitat goals at continental, national, and/or regional scales. Each of these national or continental plans has been (or is being) stepped down to a series of regional plans ([Appendix B](#)). In addition to the four continental initiatives (above), which collectively encompass all native bird species, species-specific initiatives and plans are also being completed to promote the conservation or restoration of gamebirds (e.g., [Northern Bobwhite](#) and American Woodcock) and species at risk (e.g., [Cerulean Warbler](#)).

The North American Bird Conservation Initiative ([NABCI](#)) was established to integrate planning efforts among all of the various initiatives, and to help deliver habitat conservation through an efficient, coordinated approach. Bird Conservation Regions ([BCR](#)), physiographic regions with similar avian species composition and habitat types, have been delineated across North America and adopted by NABCI as a common geographical language for conservation efforts. The U.S. Atlantic Coast Joint Venture ([ACJV](#)) and the Canadian Eastern Habitat Joint Venture ([EHJV](#)) adopted the NABCI framework of planning habitat conservation for all bird species and habitats along the Atlantic coast in 1999 and 2004, respectively. Though each BCR is unique, a consistent approach to BCR planning is important to enable use and comparison of plans from different BCRs. BCR planners have agreed to use similar methods and terms when prioritizing species, and to base priorities on objective information from the continental and regional bird plans through transparent decision rules ([More information here](#)).

### ***Background on the BCR 13 Initiative***

In December 2000, a meeting was held in Gananoque, Ontario to explore a common vision for migratory bird conservation in BCR 13. The goals of the meeting were to learn about how the Eastern Habitat Joint Venture and Atlantic Coast Joint Venture worked, the status of planning among the four bird conservation initiatives in each country, the importance of BCR 13 to all birds, potential models for a binational conservation initiative, and to plan for future workshops. In April of 2001 at Alexandria Bay, New York, and in November, 2001 in Montreal, more than 75 partners from agencies and non-governmental organizations in the US and Canada met to begin the process of integrating bird conservation planning at the BCR 13 scale and reaching consensus on priorities. Workshop attendees focused on identifying priority species, habitats, and important focus areas; discussed how to set population and habitat goals; and developed strategies to deliver conservation projects within BCR 13 particularly within specific focal regions. Those workshops and subsequent work by partners resulted in much of the material contained in this plan.

Chuck Hayes, formerly of the ACJV, worked with partners to summarize the workshop information (Hayes et al. 2005) and compile a draft conservation plan for BCR 13. Based on the draft plan, ACJV staff restarted the process of updating and completing an all-bird conservation plan for BCR 13 in 2005. Mitch Hartley, serving as BCR coordinator, worked with four international technical committees and a binational [Steering Committee](#) to update and revise the draft plan from 2001 so that it accurately reflected and stepped down the priority species and status information in all the continental and regional bird plans ([Appendix B](#)), many of which came out—or had been updated—after the original BCR 13 workshops in 2001.

## ***Executive Summary***

The Lower Great Lakes/St. Lawrence Plain Bird Conservation Region (BCR 13) provides continentally-important habitat resources for migratory birds. The highest bird habitat values are associated with its major aquatic features (i.e., Lake Erie, Lake Ontario, the St. Lawrence River), and associated wetlands, which provide critical staging areas for migratory waterfowl, waterbirds, and shorebirds; several key areas are also funnels for migrating landbirds. BCR 13 provides some of the most important breeding habitat in Eastern North America for birds associated with wetlands, grasslands, and shrubs. Most landscapes in BCR 13 have been highly modified from their original, natural condition, and are now dominated by agricultural activities or human/industrial development, including large, urban areas and a large proportion of Canada's total human population. Habitat loss and degradation (e.g., fragmentation, intensive agriculture, pollution, invasive species) are the greatest threats to bird populations in BCR 13.

This plan identifies the bird species and habitats in greatest need of conservation action in this region, activities thought to be most useful to address those needs, and geographic areas believed to be the most important places for work to occur. This plan is meant to be the start of a regional bird conservation initiative with partners across BCR 13 communicating their conservation planning and implementation activities in order to efficiently deliver high priority conservation actions in a coordinated manner.

### Priority Needs

#### **Information/Monitoring**

1. Identify species currently monitored inadequately, especially if declines are suspected  
*Status:* [Northeast coordinated bird monitoring](#) effort is underway, helping to meet this need
2. Identify species for whom habitat in BCR 13 is not thought to be a limiting factor, and those species expected to benefit most directly from an increase (in quantity and/or quality) in habitat  
*Status:* Considered an important next step for BCR 13 initiative

#### **Planning**

1. Spatial analyses to identify the most important habitat patches and landscapes for priority grasslands, shrub, and wetland species  
*Status:* Pilot project underway in St. Lawrence Valley (NY) to develop new spatial data layers (e.g., grasslands, potential wetlands) and model most productive landscapes for waterfowl production and restoration. Needs to be validated, then expanded across BCR 13
2. Estimate bird populations and habitat capacity in order to set realistic conservation goals (i.e., population and habitat objectives)  
*Status:* Considered an important next step for BCR 13 initiative

### Priority Actions

1. Increase management of public lands to enhance habitat quality (i.e., density, productivity, and/or survival rates) and benefit populations of priority species
2. Increase outreach and partnerships aimed at private landowners, to improve and/or increase stewardship and management activities that benefit priority bird species
3. Continue to protect, restore and enhance conservation lands, especially those within BCR 13 focus areas, or other areas known to provide high quality habitat for priority species

## CHAPTER 2

### INTRODUCTION

#### *Physical & Ecological Description of BCR 13*

The Lower Great Lakes/St. Lawrence Plain Bird Conservation Region (i.e., BCR 13) is a relatively narrow, low-lying plain located between the Canadian (Laurentide) Shield to the north and the Appalachian Mountains to the south (Despots 1996). This plain surrounds Lakes Erie and Ontario, extending westward to Lake St. Clair and northward to Lake Huron and Manitoulin Island in Georgian Bay. To the east, the BCR extends along the St. Lawrence River to encompass the low-lying regions between the Adirondack Mountains of New York and the Laurentian Highlands to approximately Kamouraska, Quebec ([Figure 1](#)). Southward, BCR 13 includes the Lake Champlain Valley of Vermont and New York, extending to the upper Hudson River Valley and the low-lying areas surrounding the Mohawk, Black, and Richelieu Rivers. The BCR extends southwest along the Lake Erie plain in Pennsylvania and Ohio to just east of Columbus. This region encompasses 201,300 km<sup>2</sup>, with Ontario comprising the largest portion (42%), followed by New York (27%), Quebec (14%), Ohio (11%), Pennsylvania (4%), and Vermont (2%).

The Laurentide Ice Sheet covered all of BCR 13 during the last glacial period, leaving behind very prominent geological features and deep glacial deposits throughout the region. Scattered bedrock outcrops and deep moraine clay soils characterize much of the area. Thick deposits of clay are dominant in the St. Lawrence and Lake Champlain Valleys, which were once covered by the Champlain Sea. The topography is gently rolling with elevations rarely exceeding 150m in Quebec, 200m in Ontario, and 300m in Vermont and New York (Rosenberg 2000). Other notable geological features in BCR 13 include the Niagara Escarpment and the Frontenac Axis. The Niagara Escarpment is a rugged, forested ridge running some 725 km from Niagara Falls to the tip of the Bruce Peninsula, which includes Manitoulin Island, the world's largest freshwater island (Environment Canada 1999, Ricketts et al. 1999). The escarpment is a UNESCO World Heritage Biosphere Reserve, a major tourist recreation area, and much of the area (some 130 separate sites) is protected or proposed for protection ([Niagara Escarpment Commission 2005](#)). To the west of this 30-50m high bedrock scarp, the landscape is rolling topography sloping to the southwest. To the east, the area rises from Lake Ontario to the Georgian Bay. The Frontenac Axis is a low, southeast-trending ridge that connects the PreCambrian bedrock of the Canadian Shield with the Adirondack Mountains in the U.S., providing a relatively unfragmented corridor of forest between the two. Along the Frontenac Axis are numerous granitic bedrock outcrops intermixed with deep deposits of marine clay. An example of these knobs are the Thousand Islands region of the St. Lawrence River, near the outlet of Lake Ontario.

The most prominent features of BCR 13 are its two Great Lakes, Erie and Ontario, and the St. Lawrence River. Lake Erie is a relatively shallow but biologically productive lake (Abell et al. 2000). It is the most highly industrial, urbanized, and densely populated of the Great Lakes, containing about one-third of the total population of the Great Lakes Basin; it is also the most agricultural (EPA 2000). Although Lake Ontario is the smallest of the Great Lakes in surface area, it is much deeper and holds nearly four times the volume of Lake Erie. Although the Lake Ontario basin is not as urbanized, industrial, or agricultural as Lake Erie, pollution levels are relatively similar in the two lakes and--for most pollutants--higher than in the other Great Lakes in part because they receive the downstream outflow from all the others (EPA 1998). Both Lakes Erie and Ontario have a substantial effect on the local weather patterns within BCR 13, as do the Adirondack Mountains and the Tug Hill Plateau in New York State. Areas directly to the east of the two Great Lakes generally receive significant precipitation, especially in the

form of snow. In contrast, the Lake Champlain Valley lies within the rain shadow of the Adirondack Mountains and is one of the driest regions in Vermont (Laughlin and Kibbe 1985). The St. Lawrence River drains all of the Great Lakes into the Atlantic Ocean, running 760 miles/1230 km from Lake Ontario to the Gulf of St. Lawrence north of the Gaspé Peninsula. The St. Lawrence Seaway has developed into a busy shipping route.

In addition to its Great Lakes, BCR 13 has many other prominent waterbodies, including Lake Champlain—the sixth largest lake in North America—in Vermont and New York, the Finger Lakes and Oneida Lake in New York, and Lake Simcoe in Ontario. BCR 13 is characterized by a variety of other freshwater habitats including extensive marshes, bogs, ephemeral “sheetwater” wetlands, inland freshwater dune systems, freshwater tidal marshes, forested wetlands, and globally rare inland salt marshes. About 10% of the U.S. portion of the St. Lawrence Ecoregion (which corresponds to the northeastern quarter of BCR 13) is comprised of open water (Thompson et al. 2003). The upland terrestrial communities in BCR 13 were once dominated by deciduous and mixed forests but now are a mosaic of forests, agricultural fields, early-successional habitat (e.g., abandoned fields reverting to shrubland or young forests), and various forms of human development. BCR 13 contains globally rare [alvar](#) communities, which are characterized by open grasslands, shrublands, savannah, or sparsely vegetated rock barrens on limestone bedrock with very shallow, drought-prone soils. In North America alvars are restricted to the Great Lakes region, with 90% located in Ontario (Brownell and Riley 2000).

### *Historic and Current Land Use*

Because of its abundant, fertile soils, relatively mild climate, and major waterways, the Lower Great Lakes/St. Lawrence Plain has been used by humans for more than 10,000 years, and quite intensively so for the last 300 years (Thompson et al. 2003). Early colonization was concentrated in the low-lying areas of the lake plains and the St. Lawrence River, which had rich soils and abundant timber resources. The region’s flat to rolling topography, extensive waterway transport system, and the quantity and quality of its timber made the entire lake plain region very attractive for logging (Williams 1989), though the bulk of land clearing was for farms. Both the early logging and farming operations took advantage of the natural waterway network to move timber and farm products throughout the region and to broader markets (Despons 1996). Trade, timber harvesting, and clearing for farms all accelerated and extended further into the Great Lakes region, especially in New York, with the construction of the Hudson-Champlain, Richilieu, Erie, and Oswego Canals, which connected the Great Lakes, the Lake Champlain Valley, and the St. Lawrence lowlands with the entire east coast of the U.S. (Williams 1989).

Agriculture has been the dominant land use in BCR 13 for nearly three centuries. At one time this region included some of the best farmland in the settled portion of the eastern U.S., and the area still represents the most important agricultural region in eastern Canada. Today the mosaic of agricultural grasslands in many BCR 13 landscapes supports some of the largest concentrations of migrant birds dependent on grasslands and early successional habitat in eastern North America (Rosenberg 2000). This farmland matrix is interspersed with remnant forest and wetland patches and punctuated by villages, towns, cities, and several large metropolitan areas. Based on a combined land cover GIS for all of BCR 13, the “agricultural” cover type comprises over six million hectares or 30% of the total land area. The separate “hay/pasture” class accounted for another 21% of total area (4.2 M ha). Based on a combined land cover GIS for all of BCR 13, about a third of BCR 13 is now covered with upland forest, mostly deciduous (21.8% of area), followed by mixed (8.6%) and conifer forest (3.4%). Five percent of the land area is in the urban class. The remaining 10% of land cover is open water (5.5%), forested wetland (2.6%), or open wetland (<1%).



Nearly 95% of the area of original native vegetation in BCR 13 has been—at one time or another—logged or converted to agriculture and/or urban development (Larson et al. 1999, Ricketts et al. 1999). Clayplain forests (red maple, beech, hemlock, and oaks) and sandplain forests (black and red oak, white and pitch pine, red maple), which once dominated the region, remain today in relatively small, isolated fragments. Very few blocks of remnant habitat greater than 250 km<sup>2</sup> remain (Ricketts et al. 1999). Based on 1992/1993 land cover data, mean patch sizes of different cover types in BCR13 were highest for agriculture in Canada (95 ha), whereas patches of this type in U.S. portions of BCR 13 averaged only 12 ha. The next largest habitat patches were for the hay/pasture class in the combined Vermont/New York region (mean = 47 ha) which were nearly twice as large as the average hay/pasture patches in the Ohio/Pennsylvania portion of BCR 13 (28 ha), which were twice as large as the mean patch size in the Canadian portion of BCR 13 (14 ha). Mean patch size for deciduous forest was highest in Ohio/Pennsylvania (31.5 ha), lowest in Canada (13.7 ha), and intermediate in Vermont/New York (19 ha). Mean patch sizes for mixed or conifer forests were 8-9 ha in all portions of BCR 13 except Ohio and Pennsylvania, where they were smaller (3.4 and 3.9 ha, respectively). There was less variation in wetland habitat types; patches of open or forested wetlands averaged 8 ha BCR-wide. There are undoubtedly errors associated with these combined land classification data, and the source information is now a decade out of date, so the relative proportions above should not be considered precise.

Historically, wetlands were more prevalent in BCR 13 landscapes than they are today. However, due to the highly productive soils associated with many wetlands, agricultural practices over the last 200 years have resulted in extensive wetland losses. As much as 50% of the wetlands in the Lake Champlain basin has been lost to development and draining for agriculture, and southwestern Ontario has lost about 90%. In Quebec, more than 3,200 ha of wetlands were lost between 1945 and 1976 with most being drained for agricultural activities (Dryade 1981). An estimated 70 percent of the lower Great Lakes-St. Lawrence River shoreline marshes and swamps are estimated to have been converted to other uses (National Wetlands Working Group 1988, [Wetlands International 1996](#)), so BCR 13 contains relatively few large, undeveloped stretches of lakes and rivers. Most shorelines are adjacent to agricultural uses, housing development, or concentrated tourism development (e.g., the Thousand Islands area in New York and Ontario). Today, many wetlands associated with shorelines are at high risk due to development pressure and water level control. In a few parts of BCR 13, this trend is reversing. For example, the Lake Plain region of central New York has experienced a net increase in wetland area, mostly due to reversion of abandoned farmland. In many BCR 13 landscapes, farm abandonment and a tremendous increase in beaver populations are resulting in the creation of new and sometimes large complexes of forested and scrub-shrub wetlands. However, important scrub-shrub and emergent wetlands continue to decline BCR-wide (NYDEC 2000). Most of the larger waterbodies in BCR 13 have been dammed, moderately to heavily developed, and polluted.

A variety of agricultural practices are conducted in BCR 13 including dairy, beef, equine, and sheep farming, as well as truck farms for vegetables and fruit. Grains such as corn and wheat are common crops throughout the BCR, as are soybeans. In recent decades agriculture has declined in most U.S. portions of BCR 13 and intensified in the Canadian portions. Declines in farming in Vermont, New York, Ohio, and Pennsylvania have been occurring for more than two decades ([USDA 2002 Census of Agriculture](#)). Decreases from 1987 to 1997 for the respective states were seen in numbers of farms (decreasing by 10%, 16%, 13.5%, and 12%, respectively) and total cropland (down by 13%, 12%, 5%, and 7%, respectively). Cropland area has declined over the entire U.S. Great Lakes Basin from 22.2 M acres (9 M ha) in 1982 to 19.7 M acres (8 M ha) in 2003; pasturelands decreased from 5.8 M acres (2.35 M ha) to 4.4 M acres (1.8 M ha) in the same period ([National Resources Inventory 2003](#)). During the same period agriculture has intensified in the Ontario and Quebec portions of BCR 13, which are

considered prime farmland. There have been province-wide decreases in both Ontario and Quebec in terms of the number of farms (28% and 33% respectively) and the total area in farms (9.5% and 9.6%), similarly to the U.S. portions of the BCR. However, the area in crops has increased, slightly in Ontario (to 3.66 M ha in 2001), and by 5% in Quebec (up to 1.85 M ha) during the last two decades (Statistics Canada 2001). In both provinces the average area in crops per farm reporting has increased from 41 ha (Quebec) and 48 ha (Ontario) to 71 ha and 68 ha, respectively (Statistics Canada 2001).

During the past two decades the area of developed land in the U.S. portion of BCR 13 increased from 5.8 M acres (2.35 M ha) to 8.0 M acres (3.2 M ha). The rate of development has accelerated in recent years; from 1992-1997 the average annual rate of rural land converted to developed uses was 250,020 acres (101,183 ha) in the combined state-wide area of Vermont, New York, Ohio, and Pennsylvania ([National Resources Inventory 2003](#)). The proportion of converted rural land that was made up of agricultural land varied from about 40% in Vermont and New York to 60% in Ohio. Land uses other than agriculture—especially urban and suburban housing development—typically command higher prices and subdivision results in parcelization of large ownerships into a great number of small parcels. Smaller parcels are less likely to be managed as open lands and those that are not developed generally revert to secondary forests.

In some parts of BCR 13, such as the St. Lawrence Valley in New York, the farmland is considered marginal and predominantly used as pastures and hayfields. These agricultural grasslands contain mostly cool season grasses such as smooth brome, orchard, reed canary, and timothy. Interspersed are warm season grasses dominated by switchgrass and little bluestem. Agricultural grasslands in BCR 13 are of particular value to migratory birds in part because the cool, wet climate and underlying soil types limit the intensity of agricultural use in some areas. For example, hay may be cut later and less frequently than in other parts of eastern North America, increasing grassland bird productivity. However, the relatively low agricultural productivity of these areas resulted in farm abandonment in many parts of BCR 13 in the early and middle twentieth century. This resulted in a pulse of early-successional habitat as grasslands became shrublands that ultimately reverted to mature secondary forests in time. As these transitional, successional habitats matured (or in many cases were developed), a suite of old-field and shrubland-associated birds has demonstrated significant declines in BCR 13 and across eastern North America for the last few decades (Askins 2000).

Aside from agricultural activities, human development in BCR 13 is predominately in the form of small villages, towns, and hamlets. Intensive urban and residential development is generally confined to discrete areas in BCR 13 where major cities are located, including suburban areas around these cities. Four large Canadian urban centers are within BCR 13, including Toronto, Canada's largest city (~5 million), and Ottawa, the national capital (~1 million), both of which are in Ontario. Montreal, the largest city in Quebec and second largest in Canada, has 3.4 million people, followed by Quebec City with approximately 680,000. The Provinces of Ontario and Quebec together contain 64% of Canada's human population, and most of those people live within BCR 13 (Despouts 1996). Cleveland, Ohio, is the largest city on the U.S. side of BCR 13, with a population of approximately three million. Buffalo and Rochester, NY, each have over one million people in their metropolitan area. A number of other medium and smaller cities are located throughout the U.S. portion of the BCR including the capital of New York, Albany (~875,000); Syracuse, NY (~732,000); Canton, OH (~400,000); Erie, PA (~280,000); and Burlington, VT (~170,000).

## *Major Avian Habitat Types*

The dramatic changes that have occurred in the last centuries in nearly all habitat types of the Lower Great Lakes/St. Lawrence Plain have undoubtedly had a substantial impact on many bird populations. Considering the location of BCR 13, it is conceivable that many if not most migratory birds in North America pass through this region during spring or fall. Use of stopover habitat differs by species and season (Chernetsov 2006), but it can be a critical link in the annual cycle of bird populations (Arzel et al. 2006, Drent et al. 2006). Stopover habitat quality affects the survival of birds to and from breeding and wintering areas, and often may impact their success (e.g., reproductive output) upon arrival to those areas (Newton 2006). Therefore, all avian habitats in BCR 13 should be considered for their potential importance to different species at different times of the year, since many species will use habitats during migration that differ from those that they rely upon for breeding or wintering (Chernetsov 2006).

The dominance of agriculture in the Lower Great Lakes/St. Lawrence Plain, especially agricultural grasslands, has provided a critical stronghold for grassland-nesting migratory birds in the northeastern U.S. and southeastern Canada. For example, approximately 20% of the global population of Bobolink nests within BCR 13. Many agricultural fields produce grains that provide an abundant food source for many bird species, which is one reason that BCR 13 includes such important staging habitat during spring and fall migration. BCR 13 also contains a very diverse and complex mix of wetland types, including continentally-important river and lake systems, tidal freshwater marsh, acidic bogs, ephemeral sheetwater wetlands on agricultural fields, and seasonally-flooded lakeplain forests stretching for hundreds of kilometers.

The large areas of open water and vegetated wetlands in BCR 13 provide habitat for millions of waterfowl, waterbirds, and shorebirds each year, especially during spring and fall migration. For example, approximately 700,000 ducks and geese pass through the Montezuma wetlands complex in central New York every year during migration (Burger and Liner 2005). Ten of 13 designated waterfowl focus areas in New York identified by the Atlantic Coast Joint Venture are within BCR 13 boundaries. The Niagara River corridor supports one of the world's largest concentrations of gulls during the fall and winter with one-day counts exceeding 100,000 individuals. Mallard nesting density in parts of the St. Lawrence Valley equals or exceeds average densities in the prairie pothole region of the U.S. and Canada.

Farm abandonment in the last century resulted in relatively large amounts of grassland habitat undergoing natural succession and shifting to shrubby fields, young forests, and ultimately mature, second-growth forests. This is reflected by the fact that most grassland-nesting birds are of conservation concern today in eastern North America. In BCR 13, more priority bird species are associated with shrublands and successional habitat than with any other upland habitat type ([See Chapter 3](#)). In contrast, forest cover in BCR 13 is probably higher than it has been at any time in the last 200 years, and it has grown significantly even in recent decades. Consequently, there are relatively few priority bird species in BCR 13 that rely on forested habitat, and many of these species are associated with younger forest (e.g., Rose-breasted Grosbeak, Brown Thrasher, Baltimore Oriole) or disturbed forests (e.g., Canada Warbler, Black-throated Blue Warbler). Many of the remaining species of forest-associated birds are habitat generalists that have similar abundance in young, middle-aged, or more mature forests (e.g., Black-billed Cuckoo, Wood Thrush, Scarlet Tanager). For more information about each of the major habitat types described in this plan see [Chapter 3](#).

## CHAPTER 3.

### PRIORITY SPECIES & HABITATS

#### *Approach*

The diverse habitat types in BCR 13 and its geographic location make it an important region for many species of migratory birds in terms of breeding, migration and staging, or wintering habitat. One goal of this plan is to identify the highest priority bird species in BCR 13 based on factors such as global or continental conservation concerns, the importance of this region to a species' global or continental distribution (i.e., its "BCR responsibility"), its population trend in the region, and the threat level in the region. This plan is therefore aimed at those avian species for which partners in the Lower Great Lakes/St. Lawrence Plain have ***a responsibility to take the actions necessary to monitor, conserve, and/or restore bird populations to an acceptable level, and to provide and maintain the habitats required by those populations.*** In addition to the bird species listed in this plan there are hundreds of other native bird species, both common and rare, that were not determined to be conservation priorities at this time because of either:

- 1) robust or acceptable populations or trends, not requiring further conservation action, or
- 2) continental distributions that only marginally include BCR 13, so its overall population is unlikely to benefit substantially from focused conservation attention in this region

This approach to conservation is based on the reality that time, money, and other resources are limited, and that resources need to be expended as efficiently and effectively as possible. Concerted efforts to sustain or restore a particular species should be focused on those areas most critical to its long-term survival. It should be noted that by focusing on priority species and representative species-habitat suites, the BCR 13 Initiative's efforts to restore, manage, and/or conserve priority bird habitats over time will benefit most other native birds—and other wildlife—in this region.

#### *Methods*

Priority bird species were selected according to objective decision rules ([Table 1](#)) based on BCR-specific information provided in the continental and regional plans produced by the major bird initiatives. Species were considered to be "Highest Priority" if their continental concern level was at the highest level, it was considered to have high or moderate BCR responsibility, and its BCR concern was considered to be at the highest level. BCR concern was based either on the BCR concern value that was published in the relevant regional stepdown plan (e.g., shorebird or waterbird plans), its population trend within the BCR (if known), or the threat level within the BCR. BCR responsibility was likewise derived from the appropriate continental or regional stepdown plans.

Complete details on the methodology, criteria, and raw "input data" used to evaluate each species are provided in [Appendix A](#). This process included peer-review and validation of the input data that decision rules were applied to, by a technical committee of two experts from each of the four major bird initiatives, one each from Canada and the U.S. Eighty priority bird species were identified by this process ([Table 2](#)).

BCR 13 priority species were divided into a three-tiered framework ([Table 1](#)), with *Highest* priority given to species requiring serious and/or immediate attention. These species should generally be favored over others when making decisions that direct management, funding, or other conservation actions. *High* priority species are those for which conservation attention is important but not quite as critical in our region as for Highest priority species, typically because regional responsibility is low or

because continental concerns or observed population declines are not as serious. *Medium* priority species are those for whom threats are considered less serious, populations are considered more secure, or this region is considered of minor importance to a species’ continental distribution. The latter of these includes species of high conservation concern that are at the edge of their range and very uncommon in BCR 13 (e.g., Red-headed Woodpecker, Prothonotary Warbler, Loggerhead Shrike). Conservation partners should be aware of and consider the conservation needs and trends of all priority species and, whenever possible, strive to include and positively affect their populations as part of larger planning and implementation efforts. A fairly high proportion of the species in all three tiers are relatively common in many parts of BCR 13, so these species can be thought of as indicators of different habitat types, and used to help represent, raise awareness, monitor, and measure progress towards restoring and sustaining all bird populations in the region.

Priority tiers may be helpful in guiding conservation actions, when faced with a choice as to which species/habitats to affect, and other factors are basically equal. Of course, the reality of conservation is that all else is seldom equal, so it may be difficult to choose between providing some limited benefit (or a lower probability of benefits) to a Highest priority species versus strong benefits (or a higher probability of benefits) to a High priority species.

**Table 1.** Decision rules for determining conservation tier for priority bird species in BCR 13. See [Appendix A](#) for raw input data that decision rules were applied to, including modifications made during expert peer review of data.

PriorityTier	Continental Concern	BCR Responsibility	BCR Concern	Rule
Highest	HIGH	HIGH or MOD	HIGH	a
High	MODERATE	HIGH or MOD	HIGH	b
	HIGH	HIGH or MOD	MODERATE	c
	MODERATE	HIGH	MODERATE	d
Medium  (Stewardship)	HIGH or MOD	LOW *	HIGH	e
	LOW	HIGH or MOD	HIGH	f
	HIGH	LOW *	MODERATE	g
	MODERATE	MODERATE	MODERATE	h
	LOW	HIGH	MODERATE	i
	HIGH	HIGH or MOD	LOW	j
	MODERATE	HIGH	LOW	k
	LOW	HIGH **	LOW	l

**Table 2.** Priority bird species in the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region (BCR 13). See [Appendix A](#) for more on methods and raw input data.

Highest Priority	High Priority	Medium Priority
Canada Goose (Atl/SJB)	Tundra Swan	Greater Snow Goose
American Black Duck	Wood Duck	Mallard
Lesser Scaup	Northern Pintail	Blue-winged Teal
Long-tailed Duck	Canvasback	Redhead
Common Goldeneye	Greater Scaup	White-winged Scoter
Piping Plover	Barrows Goldeneye	Common Merganser
Golden-winged Warbler	American Bittern	Northern Bobwhite
Cerulean Warbler	King Rail	Common Loon
Henslow's Sparrow	American Golden-Plover	Pied-billed Grebe
	Solitary Sandpiper	Least Bittern
	Buff-breasted Sandpiper	Black-crowned Night Heron
	Short-billed Dowitcher	Northern Harrier
	American Woodcock	Yellow Rail
	Little Gull	Virginia Rail
	Common Tern	Black-bellied Plover
	Black-billed Cuckoo	Greater Yellowlegs
	Wood Thrush	Upland Sandpiper
	Brown Thrasher	Whimbrel
	Blue-winged Warbler	Hudsonian Godwit
	Field Sparrow	Marbled Godwit
		Red Knot
		Sanderling
		Semipalmated Sandpiper
		Least Sandpiper
		Pectoral Sandpiper
		Dunlin
		Wilson's Snipe
		Wilson's Phalarope
		Bonaparte's Gull
		Black Tern
		Short-eared Owl
		Chimney Swift
		Red-headed Woodpecker
		Northern Flicker
		Willow Flycatcher
		Loggerhead Shrike
		Bank Swallow
		Black-throated Blue Warbler
		Prairie Warbler
		Bay-breasted Warbler
		Prothonotary Warbler
		Worm-eating Warbler
		Canada Warbler
		Scarlet Tanager
		Grasshopper Sparrow
		Song Sparrow
		Rose-breasted Grosbeak
		Bobolink
		Eastern Meadowlark
		Rusty Blackbird
		Baltimore Oriole

## *Species Habitat Suites*

The main goal of the BCR 13 Initiative is to integrate all the major migratory bird initiatives to more effectively and efficiently deliver habitat conservation within this region. To accomplish this, priority species were grouped by their respective habitat types. Priority habitats were identified by aggregating priority bird species into broad habitat categories for all of BCR 13 ([Table 3](#)). The set of habitats used in this plan were derived from the various map and information products available (e.g., National Land Cover Data in the US), by merging and cross-walking various habitat and land-use categories into a unified set that form the basis of a common habitat language to be used by partners in both the U.S. and Canada.. This integration of species-habitat suites conveys the linkage among the various bird groups ([Table 4](#)) and allows us to begin integrated habitat conservation.

**Table 3.** Aggregated priority habitats used in the Lower Great Lakes/St. Lawrence Plain (BCR 13) Conservation Plan.

<u>Category</u>	<u>Definition</u>
Open Water/Riverine	Includes all deep-water lacustrine and riverine habitats and rocky riverine habitats.
Shoreline Sand/Mud	Shoreline sand and mud associated with deep-water <a href="#">lacustrine</a> and riverine habitats.
Emergent Marsh	Emergent marshes dominated by persistent and non-persistent vegetation. Includes lacustrine, riverine, <a href="#">palustrine</a> , and estuarine wetlands.
Scrub-Shrub Wetlands	Wetlands dominated by woody vegetation < 6 m tall. Includes shrubs, young trees, or stunted trees and shrubs. May represent a successional stage leading to forested wetlands.
Forested Wetlands	Wetlands dominated by woody vegetation ≥6 m tall. Generally associated with palustrine systems adjacent to riverine systems, including beaver flowages.
Deciduous/Mixed Forests	A diverse assemblage of deciduous hardwoods that make up upland forest habitats in BCR 13 including maple, oak, hickory, beech, and birch associations.
Shrub/Early Successional	Includes early successional habitats such as shrublands and young forests consisting of seedlings or sapling trees.
Agricultural Grasslands	Includes pastures, hayfields, and fallow fields.
Artificial Cover	Refers to graveled rooftops and chimneys.

**Table 4 (A).** Species-Habitat Suites for BCR 13. Priority bird species grouped by wetland habitat type. Species in bold are Highest Priority, those in italics are High Priority. Note that many priority species are listed under more than one habitat type; those species are indicated by an asterisk.

<b><u>Emergent Wetland</u></b>		
<b>American Black Duck*</b>	<i>Little Gull*</i>	Mallard*
<b>Canada Goose (Atl/SJB)*</b>	<i>Northern Pintail</i>	Northern Harrier*
<b>Common Goldeneye*</b>	<i>Tundra Swan*</i>	Pied-billed Grebe
<b>Lesser Scaup*</b>	<i>Wood Duck*</i>	Redhead
<i>American Bittern</i>	Black Tern	Short-eared Owl*
<i>Canvasback*</i>	Black-crowned Night Heron*	Virginia Rail
<i>Greater Scaup*</i>	Blue-winged Teal	Wilson's Phalarope
<i>King Rail</i>	Common Merganser*	Wilson's Snipe
	Least Bittern	Yellow Rail
<b><u>Open Water/Riverine</u></b>		
<b>Canada Goose (Atl/SJB)*</b>	<i>Barrows Goldeneye</i>	Bonaparte's Gull*
<b>Common Goldeneye*</b>	<i>Canvasback*</i>	Common Loon*
<b>Lesser Scaup*</b>	<i>Common Tern</i>	Common Merganser*
<b>Long-tailed Duck</b>	<i>Greater Scaup*</i>	Greater Snow Goose
	<i>Little Gull*</i>	Redhead
	<i>Tundra Swan*</i>	White-winged Scoter
<b><u>Shoreline Sand/Mud</u></b>		
<b>Piping Plover</b>	Bank Swallow	Pectoral Sandpiper
	Black-bellied Plover	Red Knot
<i>American Golden-Plover</i>	Dunlin	Sanderling
<i>Buff-breasted Sandpiper</i>	Greater Yellowlegs	Semipalmated Sandpiper
<i>Short-billed Dowitcher</i>	Hudsonian Godwit	Whimbrel
<i>Solitary Sandpiper</i>	Least Sandpiper	Bonaparte's Gull*
	Marbled Godwit	Common Loon*
<b><u>Forested Wetland</u></b>		
<b>American Black Duck*</b>	<i>Wood Duck*</i>	Prothonotary Warbler
<b>Cerulean Warbler*</b>	Black-crowned Night Heron*	Rusty Blackbird*
<b>Common Goldeneye*</b>	Canada Warbler*	Willow Flycatcher*
<b><u>Scrub-shrub Wetland</u></b>		
<b>American Black Duck*</b>	<i>American Woodcock*</i>	Mallard*
<b>Golden-winged Warbler*</b>	<i>Blue-winged Warbler*</i>	Willow Flycatcher*
	<i>Wood Duck*</i>	

**FOR UPLAND HABITATS SEE TABLE 4B ON FOLLOWING PAGE...**



**Table 4 (B).** Species-Habitat Suites for BCR 13. Priority bird species grouped by upland habitat types. Species in bold are Highest Priority; those in italics are High Priority. Note that many priority species are listed under more than one habitat type; those species are indicated by an asterisk.

<b><u>Shrub/Early Successional</u></b>		
<b>Golden-winged Warbler*</b>	<i>American Woodcock*</i>	Baltimore Oriole
	<i>Blue-winged Warbler*</i>	Loggerhead Shrike
	<i>Brown Thrasher*</i>	Northern Bobwhite
	<i>Field Sparrow</i>	Northern Flicker
		Prairie Warbler
		Red-headed Woodpecker
		Song Sparrow*
<b><u>Deciduous/Mixed Forest</u></b>		
<b>Cerulean Warbler*</b>	Baltimore Oriole	Rose-breasted Grosbeak
<i>Black-billed Cuckoo</i>	Bay-breasted Warbler	Scarlet Tanager
<i>Brown Thrasher*</i>	Black-throated Blue Warbler	Worm-eating Warbler
<i>Wood Thrush</i>	Canada Warbler	
<b><u>Agricultural Grasslands</u></b>		
<b>Henslow's Sparrow</b>	Bobolink	Short-eared Owl*
	Eastern Meadowlark	Upland Sandpiper
	Grasshopper Sparrow	Rusty Blackbird*
	Northern Harrier*	Song Sparrow*
<b><u>Artificial Cover</u></b>		
Chimney Swift		

***FOR WETLAND HABITATS SEE TABLE 4A ON PRECEDING PAGE...***

Each of the nine species-habitat suites are discussed below. Wetland habitats are presented first, followed by upland habitats. The upland habitats are divided along a successional gradient, starting with agricultural grasslands (including hay, pasture, and native grasslands), followed by shrub/early successional, and deciduous/mixed forest. Of the 80 priority bird species within this BCR, 58 birds (73%) rely upon or are associated with aquatic ecosystems or wetland habitats, whereas 28 species (35%) are associated with upland habitat types ([Table 4B](#)). Eight species (Cerulean Warbler, Golden-winged Warbler, Blue-winged Warbler, American Woodcock, Canada Warbler, Rusty Blackbird, Short-eared Owl, and Northern Harrier) are strongly associated with both wetland and upland habitat types in BCR 13.

Emergent Wetlands

<b><u>BCR 13 Priority bird species associated with emergent wetlands</u></b>		
<b>American Black Duck</b>	<i>Little Gull</i>	Mallard
<b>Canada Goose (Atl/SJB)</b>	<i>Northern Pintail</i>	Northern Harrier
<b>Common Goldeneye</b>	<i>Tundra Swan</i>	Pied-billed Grebe
<b>Lesser Scaup</b>	<i>Wood Duck</i>	Redhead
<i>American Bittern</i>	Black Tern	Short-eared Owl
<i>Canvasback</i>	Black-crowned Night Heron	Virginia Rail
<i>Greater Scaup</i>	Blue-winged Teal	Wilson's Phalarope
<i>King Rail</i>	Common Merganser	Wilson's Snipe
	Least Bittern	Yellow Rail

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

The emergent wetlands class represents a diversity of different habitat types, ranging from large lacustrine, permanently-flooded wetlands to palustrine, ephemeral sheetwater wetlands in agricultural fields. The shoreline of the St. Lawrence River and Great Lakes contain important palustrine and lacustrine wetlands. Submerged aquatic vegetation characterizes some shallow-water bays of the larger lakes, such as Missisquoi Bay in Lake Champlain, and the slow, calm waters of the St. Lawrence River around the Berthier and Sorel Islands and especially in Lake St. Pierre (Despouts et al. 1996). Emergent marshes are also associated with riparian areas and deltas of the Missisquoi, Richelieu, St. Lawrence, and Hudson Rivers. A unique inland barrier beach and backbarrier marsh system at the eastern end of Lake Ontario provides an extensive diversity of wetland types adjacent to deep, open water habitat. Tidal brackish and freshwater marshes are found in the upper Hudson River and St. Lawrence River estuaries. The Hudson River is tidal inland to the Troy Dam and the middle to upper reaches of the Hudson River Estuary are characterized by brackish water ranging in salinity from five parts per thousand to freshwater. The distribution and composition of vegetation and faunal communities in that ecosystem depend on water depth and salinity. The upper St. Lawrence estuary from Île d'Orleans to Kamarouska in BCR 13 also is fresh to brackish. This area of the St. Lawrence estuary contains up to 60% of all bulrush marshes in Quebec with the dominant species being American bulrush (Despouts et

al. 1996). In the larger bulrush communities wild rice is prevalent as well. One unique, globally significant wetland type in central New York is inland saltmarsh. Another unique feature of BCR 13 is the prevalence of small, isolated, ephemeral sheetwater wetlands in the St. Lawrence Valley, which are associated with agricultural fields. These wetlands form from snowmelt or spring rains in the bottomlands or in flat areas where soils have high clay content (Northern Ecological Associates 1994). The abundance of these wetlands varies with precipitation and fluctuates greatly each year. However, they are important as spring stopover habitat for waterfowl and shorebirds and may be indicators of waterfowl breeding success in BCR 13 and beyond, as stopover habitat quality can be critical for the breeding success of waterfowl and other species (Arzel et al. 2006, Drent et al. 2006).

The emergent wetlands class supports more priority species in BCR 13 than does any other habitat group. About a third of the region's priority species use the variety of emergent wetlands in BCR 13 either during breeding, staging, or migration. Most emergent wetlands in BCR 13 freeze during the winter, so are not available for the entire wintering period. The diversity of distinctly different habitat types within this group is reflected by the diversity of priority bird species associated with this type, though waterfowl and waterbirds dominate this habitat suite. Thirteen priority waterfowl species are associated with emergent wetlands in BCR 13, and all four Highest Priority species in this habitat suite are waterfowl. The American Black Duck breeds in large numbers in BCR 13 and some Black Ducks remain in this region throughout the winter by using areas of open water such as Pymatuning Reservoir and deep-water habitats associated with large bodies of open water. Wood Duck and Mallard also are common breeders throughout the BCR, and Mallard nesting densities in parts of the St. Lawrence Valley (SLV) of New York meet or exceed levels seen in much of the prairie pothole region of the U.S. and Canada. Ephemeral sheetwater wetlands, prevalent in the SLV, provide particularly valuable nesting habitat for Mallard. These wetlands form in the low-lying areas of agricultural fields and are adjacent to dense upland nesting cover. Both the diversity and abundance of breeding waterfowl is higher in Canadian than in U.S. portions of BCR 13, as Northern Pintail, Common Goldeneye and Lesser Scaup breed in Ontario and Quebec at low densities. For most waterfowl species, the major importance of BCR 13 is the stopover habitat it provides during spring and fall migration. Many species that are relatively rare as breeders in BCR 13 stage in the region in significant numbers, including Greater Scaup and Northern Pintail (Malecki unpubl. data). The St. Lawrence River, the Great Lakes, and several other large, emergent wetland complexes within BCR 13 support large concentrations of migratory waterfowl. For example, each year more than 700,000 waterfowl pass through the Montezuma wetland complex, located in central New York, including over 500,000 Canada geese, 15,000 snow geese, 100,000 mallards, and 25,000 black ducks (Burger and Liner 2005).

A number of secretive marshbirds and other waterbirds rely on emergent wetlands, including American Bittern, King Rail (both High Priority), Black Tern, Least Bittern, Pied-billed Grebe, Virginia Rail, and Yellow Rail. The eastern Lake Ontario barrier beach system, with its unique inland barrier dunes and backbarrier emergent wetlands, supports many breeding and migrating waterbirds, including more than 10% of the Black Terns nesting in New York. Emergent marshes in Missisquoi Bay, on the northern end of Lake Champlain, harbor >95% of the Black Tern nests in Vermont. Only two shorebird species breed in emergent wetlands in BCR 13: Wilson's Snipe is a relatively common breeding species across BCR 13, and Wilson's Phalarope is a very rare breeder in Ontario. However, a great many shorebird species pass through BCR 13 going to or from arctic breeding grounds, and these birds use a wide variety of emergent wetlands as well as other wetland types.

Overall, more than half of the priority bird species strongly associated with emergent wetlands use this habitat for breeding, and about half of the priority landbirds associated with emergent wetlands use this

habitat only during migration or staging. As with other habitat types, some species listed under this habitat are also strongly associated with other habitat types; for example, Short-eared Owl and Northern Harrier both are associated with grassland habitat for nesting. These species may occur on upland grassland areas that are lacking wetlands, though in most of BCR 13 they are found where both habitats are present and they may rely upon wetlands during part of the year.

Open Water/Riverine

<b><u>BCR 13 Priority bird species associated with open water/riverine habitat</u></b>		
<b>Canada Goose (Atl/SJB)</b>	<i>Barrows Goldeneye</i>	Bonaparte's Gull
<b>Common Goldeneye</b>	<i>Canvasback</i>	Common Loon
<b>Lesser Scaup</b>	<i>Common Tern</i>	Common Merganser
<b>Long-tailed Duck</b>	<i>Greater Scaup</i>	Greater Snow Goose
	<i>Little Gull</i>	Redhead
	<i>Tundra Swan</i>	White-winged Scoter

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

One of the predominate features of BCR 13 is the tremendous amount of deep, open water habitat in the form of the region's many and large lakes and rivers. Lakes Erie and Ontario are the most prominent deep-water features in the region with approximately 17,250 mi<sup>2</sup>/ 44,660 km<sup>2</sup> in surface water area (57% in Erie). Riverine habitat is associated primarily with the St. Lawrence, Niagara, upper Hudson, and Ottawa Rivers, but smaller rivers such as the Mohawk, Black, and Richelieu also provide important migration corridors. A great diversity of species has been documented on the St. Lawrence River and areas like Chautauqua Lake in Western New York, and the Niagara River corridor, which are designated as Important Bird Areas in New York (Burger and Liner 2005).

Twelve species of waterfowl and four waterbirds designated as priority species were associated with relatively deep or open-water habitat, mainly for migration and wintering (Table 4A). The St. Lawrence and other large rivers in BCR 13 stage large flocks of American Black Duck and other species in the fall, as does Missisquoi Bay on the north end of Lake Champlain (in southern Quebec and northern Vermont). Some American Black Duck remain in BCR 13 throughout the winter by using areas of open water such as Pymatuning Reservoir in Pennsylvania and deep-water habitats associated with large bodies of open water. Pymatuning Reservoir and Chautauqua Lake in western New York also are critical for Tundra Swan, harboring several thousand during migration and winter. Over 22 years in New York, average counts of 4,800 Redhead, 28,000 Canada Geese, and 7,000 Mallard were seen on the Finger Lakes with as many as 100,000 Canada geese in one season (Burger and Liner 2005). Also, 76,704 White-winged Scoters, 44,167 Greater Scaup, 20,420 Long-tailed Ducks, 12,980 Black Scoter, and 10,877 Common Goldeneye have been observed during fall migration along the shores of Lake Ontario (Burger and Liner 2005). Nearly 17,000 Common Loon have been recorded migrating along the shores of Lake Ontario and funneling through the Finger Lakes to wintering grounds in Delaware Bay. Currently an estimated one million waterfowl use the St. Lawrence River either for breeding,

staging, or during migration. For example, Greater Snow Goose numbers exceeded 600,000 during recent spring migration surveys in the lower St. Lawrence around Cap Tourmente, Quebec (Béchet et al. 2004). Mergansers and goldeneyes also use the river by the thousands during migration. The Niagara River corridor hosts a large and diverse array of gulls (19 species and one-day counts of >100,000 individuals) and waterfowl (averaging 21,700 over last five years), according to Burger and Liner (2005). Canvasback, Common Merganser, Common Goldeneye, and scaup are the most abundant duck species; mid-winter surveys averaged over 22 years indicate 15,000 individuals (of all species) per year, with peak numbers >40,000 within the river corridor. The Niagara River corridor also hosts one of the most spectacular concentrations of gulls in the world. One-day counts of Ring-billed Gull, an overabundant species of management concern, can exceed 20,000 individuals; one-day counts of Herring Gull and Bonaparte's Gull can each exceed 50,000 birds (Burger and Liner 2005).

Breeding birds associated with open water habitat often nest on the many islands within the larger lakes and rivers. A number of colonies of gulls and terns are found on these islands. The Thousand Islands area of the St. Lawrence River contains at least >13 colonies (500-1000 pairs) of Common Tern (Burger and Liner 2005). An additional 400 pairs are located on Oneida Lake islands in New York. Several species of waterbirds considered overabundant also use freshwater islands as nesting habitat. The largest colony of Ring-billed Gulls in the world is located on Little Galloo Island in Lake Ontario, with more than 60,000 pairs of birds. The island also contains the largest Double-crested Cormorant colony in New York (4,000 pairs in 2004). The extensive nesting by Ring-billed Gull is a threat to other nesting species such as Common Tern and Caspian Tern, which are displaced by the gull colonies.

Shoreline Sand/Mud

<b><u>BCR 13 Priority bird species associated with Shoreline Sand/Mud</u></b>		
<b>Piping Plover</b>	Bank Swallow	Pectoral Sandpiper
	Black-bellied Plover	Red Knot
<i>American Golden-Plover</i>	Dunlin	Sanderling
<i>Buff-breasted Sandpiper</i>	Greater Yellowlegs	Semipalmated Sandpiper
<i>Short-billed Dowitcher</i>	Hudsonian Godwit	Whimbrel
<i>Solitary Sandpiper</i>	Least Sandpiper	Bonaparte's Gull
	Marbled Godwit	Common Loon

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

Nearly all priority shorebirds identified in BCR 13 are associated with this habitat type, and 16 of the 19 members of this species-habitat suite are shorebirds. Only three of the 18 species listed above rely on shoreline habitat for breeding: Common Loon nest along lake shores, Bank Swallow use eroding banks along rivers or lakes, and Piping Plover—now extirpated as breeders in BCR 13—were found on the shoreline of Lake Ontario as recently as 1984 (Burger and Liner 2005), and historically occurred along the shoreline of Lake Erie near Presque Isle (Crossley 1999). Although the importance of the BCR 13

region to migrating shorebirds is not particularly well documented, there are certainly some productive areas for rest, maintenance, and—particularly along the St. Lawrence River in Quebec—food resources for staging birds. Some species such as the Buff-breasted Sandpiper are relatively rare in BCR 13, but may occur in relatively large numbers when they are observed. Other species such as Whimbrel, Hudsonian Godwit, Marbled Godwit, and Red Knot generally over-fly most of this region, but are of great concern at the continental scale. Historically, Common Tern nested along the sandy beaches of Pennsylvania’s Presque Isle State Park in Lake Erie and on eastern Lake Ontario in New York. Currently, this species uses sandy spits and beaches mostly for foraging during migration. Similarly, many other priority species in BCR 13 can be incidentally observed resting or foraging along river and lake shorelines, including many species not listed here. Shoreline management activity in BCR 13 may not provide dramatic benefits to these species, but habitat protection is important due to development pressure, and management of water levels is potentially critical to shorebird distributions. Also worth noting for this species/habitat suite are low-lying, wet, and highly productive agricultural fields such as the Pelee onion fields and St. Clair flats of southwestern Ontario. Though these agricultural areas do not, strictly speaking, fall into the sand/mud flat category, they are important habitats and act much like mudflats in attracting migrant shorebirds, often in very large numbers. Conservation of these habitats will depend on reaching conservation agreements with the landowners who manage these fields.

Forested Wetland

<b><u>BCR 13 Priority bird species associated with Forested Wetland</u></b>		
<b>American Black Duck</b>	<i>Wood Duck</i>	Prothonotary Warbler
<b>Cerulean Warbler</b>	Black-crowned Night Heron	Rusty Blackbird
<b>Common Goldeneye</b>	Canada Warbler	Willow Flycatcher

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

Floodplain forests characterize many wetlands in the Lake Champlain Valley, the Lake Ontario lakeplain, and the riparian habitats of the Missisquoi, Richelieu, St. Lawrence, and Hudson Rivers. Forested wetlands are the most common type of wetland within the large Montezuma and Iroquois wetland complexes in central New York. Only nine priority species were associated with forested wetlands in BCR 13 (Table 3), and two of these species—Prothonotary Warbler and Rusty Blackbird—are very rare in this region. The American Black Duck, a Highest Priority species, was once a common breeder in the U.S. portion of BCR 13, but densities have dramatically declined over the years with the conversion and subsequent destruction of forested wetlands. Remaining breeding activity is relegated to suitable wetlands in localized forest fragments. In 2003, Black Duck pair density was estimated at just 0.07 pairs/km<sup>2</sup> in the St. Lawrence Valley and 0.02 pairs/km<sup>2</sup> in the Lake Plains, with populations down 5% from 2002 (AFC 2003). Southern Quebec encompasses part of the Black Duck breeding range, and it is common around the St. Lawrence River (Bordage and Reed 1996).

Although the Appalachian Highlands to the south of BCR 13 are the core of the Cerulean Warbler breeding range, this Highest Priority species occurs in high densities in BCR 13 in lake plain bottomland and riparian forests characterized by sycamore, cottonwood, silver, and red maple, which is very

different from typical breeding habitat further south. Cerulean Warbler populations appear to be increasing in the northeastern part of its range—in BCR 13—in stark contrast to the sharp declines reported throughout most of its range, including those areas with the highest densities.

Black-crowned Night Heron is the only priority waterbird species associated with forested wetlands, though other species of herons such as Great Blue Heron, Green Heron and Great Egret also use forested wetlands for breeding. Many of the heron colonies in BCR 13 are located in forested wetlands associated with larger bodies of water, such as Lake Ontario, Lake Champlain, Cayuga Lake, and the St. Lawrence River. Herons and egrets use the nearby shoreline as foraging grounds but also travel large distances to other foraging areas. The riverine Lake St. Pierre, in the St. Lawrence River, may have the largest Great Blue Heron rookery in the world, with over 1,000 pairs (DesGranges 1996).

Scrub-shrub Wetland

<b><u>BCR 13 Priority bird species associated with Scrub-shrub Wetland</u></b>		
<b>American Black Duck</b>	<i>American Woodcock</i>	Mallard
<b>Golden-winged Warbler</b>	<i>Blue-winged Warbler</i>	Willow Flycatcher

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

Only six priority bird species are strongly associated with scrub-shrub wetlands, and they are evenly distributed among Highest, High, and Medium Priority tiers. Though both Golden-winged and Blue-winged Warbler—Highest and High Priority species respectively—are locally common in wet meadows or swamps with sufficient composition of shrubs, open herbaceous areas and a forest edge, these species are most strongly associated with upland shrub habitat. Blue-winged Warbler are of conservation concern due to continental declines, but they are apparently increasing in population and distribution in the northern and eastern parts of their range (i.e., in BCR 13). This expansion is a major threat to the continued existence of Golden-winged Warbler, as the two species hybridize readily and do not long coexist when [sympatric](#).

Although American Woodcock breed primarily in young upland forests with openings or old/shrubby fields, this species is most abundant where available habitats include a mix of fields or openings, forests of different ages, and feeding habitat with moist soils and high shrub cover, such as alder swales (Keppie and Whiting 1994). Included in scrub-shrub wetlands, as defined in this plan (see [Table 3](#)), are alder swamps, wet and shrubby meadows, and poorly drained young forests, all of which contribute to prime woodcock breeding habitat. During fall woodcock rely somewhat more on alder habitats and somewhat less on upland forest habitat.

Agricultural Grasslands

<b><u>BCR 13 Priority bird species associated with Agricultural Grasslands</u></b>		
<b>Henslow's Sparrow</b>	Bobolink	Short-eared Owl
	Eastern Meadowlark	Upland Sandpiper
	Grasshopper Sparrow	Rusty Blackbird
	Northern Harrier	Song Sparrow

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

Agricultural grasslands include hayfields, pastures, native grasslands, and planted grasslands with native or exotic grass species. This species-habitat suite also includes fallow or planted crop fields to the extent that they provide bird habitat, which for most species is rather limited in comparison to the other grassland types listed. Agricultural grasslands dominate many landscapes in BCR 13 and support some of the largest populations of grassland nesting birds in eastern North America (Rosenberg 2000). Though most of BCR 13 was once covered by forest, it was, from the early 1700's onward, converted into one of the most agricultural regions of eastern North America. Today BCR 13 contains the largest contiguous areas of grassland habitat remaining in the northeastern U.S. and eastern Canada. Most of the ten priority birds associated with agricultural grasslands in BCR 13 use them for breeding, though many other species rely on them during migration. A few species (e.g., Short-eared Owl and some arctic-breeding raptors) are associated with this habitat primarily during winter, though Short-eared Owl will nest in some areas when rodent populations are on a cyclic high. Henslow's Sparrow, the only Highest Priority species in this habitat suite, has declined significantly across BCR 13, and remains only in small, scattered, local populations. The other birds in this suite have, as a group, suffered the steepest population declines of any group of birds in North America. However, BCR 13 provides significant habitat for and populations of many grassland bird species, including approximately 20% of the global breeding population of Bobolink, and a significant proportion of all the Upland Sandpipers in the eastern United States and Canada.

Mallard were virtually unknown in BCR 13 at the turn of the 20<sup>th</sup> century. However, as landscapes changed to a mix of open agricultural grasslands interspersed with small, emergent wetlands, Mallard increased dramatically and are now the most common breeding waterfowl species in BCR 13. Mallard have the highest nesting density of any grassland-breeding waterfowl in BCR 13. Although Mallard and American Black Duck often occupy similar habitats, Mallard are positively associated with cropland area in Southern Quebec whereas American Black Duck are negatively associated with it (Maisonneuve et al. 2006). This suggests that Mallard occupy many areas where American Black Duck are absent. Blue-winged Teal also are relatively common breeders in agricultural areas associated with freshwater marshes. Resident Canada Goose are increasingly common and abundant across much of the region and now cause considerable nuisance problems such as fouling small ponds and human recreation areas (e.g., parks) with waste, potentially competing for food with migratory geese of conservation concern, and posing a safety risk near airports. Migrant Canada Goose and Greater Snow Goose use BCR 13 heavily during migration and wintering, when available agricultural crops provide an ample food supply.



The biggest threats to agricultural grasslands is their continued disappearance across BCR 13, whether by succession to woody habitat through lack of management, conversion to cropland, or development for houses or businesses. Grasslands that are used for hay production often are mowed early in the summer and regularly throughout the growing season, which can greatly limit productivity of young and even increase adult mortality.

Shrub/Early Successional

<b><u>BCR 13 Priority bird species associated with Shrub/Early Successional</u></b>		
<b>Golden-winged Warbler</b>	<i>American Woodcock</i>	Baltimore Oriole
	<i>Blue-winged Warbler</i>	Loggerhead Shrike
	<i>Brown Thrasher</i>	Northern Bobwhite
	<i>Field Sparrow</i>	Northern Flicker
		Prairie Warbler
		Red-headed Woodpecker
		Song Sparrow

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

Abandonment of agricultural lands and periodic forest management (especially clearcuts) has led to a shifting distribution of early-successional habitats across BCR 13 landscapes. Of all the upland habitat types discussed in this plan, more priority species are associated with shrubs and old fields for breeding than with any other. Though this species-habitat suite encompasses both old fields and young, regenerating woodlands, most of the priority species above are associated with old field habitat. Old, brushy fields with a well-developed shrub component are likely to have a distinctly different bird community than do regenerating clearcuts. The former habitat is likely to contain Golden-winged Warbler (Highest Priority), American Woodcock, Blue-winged Warbler, Brown Thrasher, Field Sparrow (all High Priority), Baltimore Oriole, Prairie Warbler, and Song Sparrow. Regenerating clearcuts or other heavily-disturbed forests may host a few of these species (e.g., Song Sparrow, American Woodcock) but most of the others are unlikely and/or uncommon. Further, heavily disturbed patches or openings within a forest matrix often regenerate quickly, which limits the time that they can provide habitat to early-successional species. The initial stage of vegetative re-growth, characterized by dense shrubby trees (e.g., stump sprouts, *Rubus*, etc.), soon gives way (i.e., within 5-10 years) to the “pole stage” with small-diameter trees forming a closed canopy of closely spaced trees that grow quickly. As young pole stands develop height, the closed canopy shades out most understory plants. While there are clearly species of birds that are most abundant in young, developing forests (e.g., Chestnut-sided Warbler), none are priority species in BCR 13.

Most of the species in this habitat suite have declined significantly in BCR 13 in recent decades (Rosenberg 2000, RMBO 2003), and are also listed as a Continental Watchlist or Stewardship species

by Partners in Flight (Rich et al. 2004). Golden-winged Warbler has been expanding its range northward, which corresponds with the shifting availability of shrub/early successional habitats. BCR 13 represents the core of population expansion for this species in the northeastern U.S. and Ontario (Rosenberg 2000). However, Blue-winged Warbler also is expanding its range to the north and east, and hybridization between the two species may be the gravest threat to the long-term existence of the Golden-winged Warbler.

Old fields and regenerating or young forests may be particularly important to many bird species that do not use them for breeding, but rather for foraging and roosting during the post-breeding period, during migration/staging, and in winter. Recent studies have shown that many forest-interior bird species move into regenerating forests or other disturbed areas to forage after their young have fledged.

Deciduous/Mixed Forests

<b><u>BCR 13 Priority bird species associated with Deciduous/Mixed Forest</u></b>		
<b>Cerulean Warbler</b>	Baltimore Oriole	Rose-breasted Grosbeak
<i>Black-billed Cuckoo</i>	Bay-breasted Warbler	Scarlet Tanager
<i>Brown Thrasher</i>	Black-throated Blue Warbler	Worm-eating Warbler
<i>Wood Thrush</i>	Canada Warbler	

Highest Priority Species in bold; High Priority in italics. Priority species may be listed in multiple habitat types.

The deciduous/mixed forest habitat type once covered much of BCR 13. Today, only a small percentage of this type remains in a relatively undisturbed state and much of this habitat type is in small, widely-scattered remnant forests blocks. However, farm abandonment in the early 1900’s caused a rise in the percentage of mature forests throughout the latter half of the 20<sup>th</sup> century, especially in the U.S. portion of the BCR. All of the priority species within this type are landbirds, though the species suite represents a variety of different forested habitats. Both Cerulean Warbler and Wood Thrush (Highest and High Priority species, respectively) are typically associated with mature, late-successional forests, though in the Lake Ontario plain Cerulean Warbler is most common in floodplain forests. Wood Thrush, while associated with interior and edges of deciduous and mixed forests, especially well-developed, upland, mesic ones (Roth et al. 1996), may have higher occupancy rates, densities, and productivity in edges and forest patches in proximity to clearcuts and other openings (Ahlering and Faaborg 2006) than in forests lacking disturbed patches. These habitats may be sought out because they are particularly important during the postbreeding period (Vega Rivera et al. 1999), though they are also important during migration (Rodewald and Brittingham 2004). Worm-eating Warbler, Bay-breasted Warbler, and Scarlet Tanager also represent late-successional forest birds, but only the Scarlet Tanager is widespread and common because it is a forest generalist (Mowbray 1999). Worm-eating Warbler and Bay-breasted Warbler both are restricted to fairly specific—and uncommon—forest types in BCR 13: large tracts of forest with steep slopes and dense understory/shrubs (Hanners and Patton 1998), and dense, boreal, spruce-fir forest (Williams 1996), respectively. In addition to their habitat specificity, the two species are rare in BCR 13 because they are at the respective northern and southern edge of their continental

range. At the other end of the successional gradient, species like Brown Thrasher and Rose-breasted Grosbeak are associated with edges, heavily-disturbed woods, or young, regenerating forests. Black-billed Cuckoo and Baltimore Oriole are intermediate in that they may be found in younger or older forests but often are tied to forest edges and riparian areas. Two other species, Black-throated Blue Warbler and Canada Warbler, are strongly associated with disturbed forests that have a well-developed shrub-layer, in which they nest and forage. The former species is typically associated with northern hardwood (i.e., beech, maple, yellow birch) forests with some high canopy cover, whereas the latter species is more common in mixed-forests and moist woodlands.

A large and expanding population of Cerulean Warbler is located in eastern Ontario and northeastern New York. This may be the largest population of Cerulean Warbler north of their core population centers in Ohio, Pennsylvania, and West Virginia (Rosenberg 2000). Expansion of this population may be due in part to succession of abandoned agricultural lands to forest throughout the 20<sup>th</sup> century. If so, the ongoing farmland abandonment and succession should continue to provide new habitat in the future.

Of the 6,754,089 ha (16.7 M acres) of forest land in BCR 13, a little more than half (3.8 M ha or 9.4 M acres) is in the U.S. portion of the region. According to the USDA Forest Service [Forest Inventory Analysis](#) (FIA) data (based on counties in the four states that fall within BCR 13), private lands comprise 91% of total forest area and state/county/municipal lands account for only 7% of forest area. Proportional ownership is similar in New York, Pennsylvania, and Ohio, but in Vermont counties 76% of the forest area is privately owned, 13% is in state/county/municipal ownership, and 10% is in federal ownership. In all four states the dominant forest type is maple/beech/birch, accounting for 42%, 53%, 64%, and 73% of forest area in Ohio, New York, Pennsylvania, and Vermont, respectively. In three of four states oak/hickory is the second-most abundant forest type, and in Ohio that type is almost equally important (39% of forest area). In Pennsylvania the oak/hickory type makes up 19% of forest area and in New York that type accounts for 13% of the total, a proportion similar to that occupied by pine forests (12% of total). In Vermont, the pine forest type is second-most common, comprising 13% of total forest area within the BCR 13 portion of the state.

In terms of size and maturity, most forests in the U.S. portion of BCR 13 are mature, sawtimber stands. Stands with large-diameter timber account for 52% of the total forest area, ranging from from about 50% in New York and Ohio to 68% in Vermont. On average, 28% of the forest area is characterized by medium-diameter timber, ranging from 22% in Vermont to 29% in New York. Young, small-diameter forests make up 19.5% of the area in the four-state region, ranging from 10% in Vermont to 23% in Ohio. Other than the differences noted above, the proportional area with different size-classes is fairly similar among the four states and among the dominant forest types (i.e., northern hardwoods, oak/hickory), except that 70-100% of the area in the white/red/jack pine type is in the large-diameter size class in all four states. This is likely due to the fact that most mature pine stands in the region originated from plantings done in the 1930's or later. When the pine plantations are harvested they are often regenerated naturally (i.e., not planted), and dominated by hardwoods, so the resulting small-diameter stands would not be of the pine type.

#### Artificial Cover

Only one priority species, Chimney Swift, was associated with this unique habitat type in BCR 13 (Table 4), as this species has adapted to a human-altered environment and uses artificial structures almost exclusively for nesting. Chimney Swifts were first noted using chimneys in 1671 (Palmer 1949). Swifts can form flocks of thousands of birds around nesting colonies, though they have experienced a

population decline throughout the last century. This decline is likely due to a combination of factors including pesticide-use reducing their prey base, a decline in the number of chimneys, and farm abandonment. Though not a BCR 13 priority species because BCR 13 supports such a tiny portion of its continental population (<0.1%), Common Nighthawk is listed on all four State Wildlife Action Plans for BCR 13 (see [Appendix A](#)). Common Nighthawk is associated with artificial cover because it often uses gravel rooftops for nesting, in addition its natural habitat (open fields, gravel beaches, etc.). Like the Chimney Swift, Common Nighthawk is declining significantly throughout its range and within BCR 13, probably for many of the same reasons. Nighthawks may have also suffered from a reduction in suitable gravel rooftops for nesting.

### ***Population and Habitat Objectives***

Habitat conservation plans for migratory birds or other wildlife should include quantitative population objectives and an estimate of the habitat necessary to sustain desired population levels. Unfortunately, in most cases population sizes, densities, and distribution of species of interest are unknown or poorly estimated, as is scientific knowledge about how populations are affected by various management scenarios, and how those relationships differ over space and time. For example, most use of BCR 13 by waterfowl and shorebirds is during migration and wintering periods, yet explicit relationships between population objectives and the amount of habitat needed during migration have not been established in this region. The quantity or quality of habitat available in BCR 13 may not be a limiting factor to some species, but for many species it is unclear which factors limit their populations. Because habitat for any given species almost always serves as habitat for some other species too, the total amount of habitat needed is not the sum of the needs of all species but an integration of each species' needs, which accounts for the overlap among species and results in an overall goal for each habitat type. In short, this region should provide the habitat that is estimated to be needed to support bird populations at desired levels, so that habitat in our region is not nor does not become limiting to bird populations.

Setting and using population or habitat objectives should be viewed as an ongoing exercise requiring refinement, research into underlying assumptions, and improvement over time. Nevertheless, there is often a desire to set population objectives with the information currently available, in order to provide:

- 1) a baseline or starting point for habitat conservation planning (i.e., a specific goal or target)
- 2) a marketing tool to communicate concrete conservation needs to politicians and policymakers, who may be unwilling to fund something undefined
- 3) performance indicators to evaluate progress toward goals

Selecting a population goal is the critical first step. Habitat goals derive from population goals and should relate directly to them. However, existing knowledge of the relationship between habitat conditions and population response is limited for many priority species in this plan. Therefore, this initial version of the BCR 13 conservation plan presents qualitative population objectives for most species ([Appendix B](#)). The species prioritization process and these population objectives take the first step of deciding which species' populations are currently robust, which populations are in need of restoration—and to what level—and which populations are overabundant and should be reduced by management. Qualitative objectives for priority species range from maintaining current numbers to doubling the population size in the next 15 years. For other species, minimum population objectives are to maintain present numbers, which may not be reliably estimated. Where BCR 13 population estimates and objectives for priority species have been determined by the various bird initiatives, they are listed in [Appendix B](#). For example, the National Woodcock Conservation Plan has calculated the number of singing males in the 1970s and currently, and translated that into a habitat deficit. According to the

woodcock plan, the U.S. portion of BCR 13 requires an additional 1,520,494 acres (598,617 ha) of woodcock habitat and the Canadian portion of BCR 13 requires an additional 611,145 ha (1,552,308 acres) to reach the desired population goal for woodcock (i.e., 1970s level).

A fundamental concept behind [NABCI](#) is that there is a hierarchy and a direct connection between each of the major continental or national bird plans, regional plans produced under each initiative, and plans for each [Bird Conservation Region](#). In other words, information at each scale should be stepped down from the higher scale to maintain consistency across scales and to ensure that the whole is roughly equal to the sum of the parts. At the continental scale, population estimates and population objectives for many species have been articulated in the conservation plans generated by each of the major bird initiatives. For landbirds (i.e., from Partners in Flight) these have been translated directly to habitat objectives, based on abundance indices derived from [Breeding Bird Survey](#) (BBS) data. However, there has been little or no independent assessment of their accuracy at the continental scale or within BCR 13. Continental population estimates and related population/habitat objectives have been “stepped down” to the BCR and state level, based solely on BBS data on bird distributions. Aspects of this approach have been criticized by many as flawed, especially in assessing populations and habitat objectives within a given BCR. Alternative approaches have been discussed, such as developing population and habitat objectives in a “bottom-up” fashion by assessing habitat capacity and species distributions at the BCR-scale first, then summing across BCRs to arrive at continental metrics. Ideally both continental and regional-scale objectives would be set through an interactive and iterative process where regional and continental assessments inform and influence each other.

To facilitate the translation of continental population objectives into biologically sound, measurable regional and local population-based habitat targets, a Partners in Flight working group recommended a process referred to as [Five Elements Process](#) (Will et al. 2005). This is a process by which biologically-based, spatially-explicit, landscape-oriented habitat objectives can be developed to sustain bird populations at levels recommended through the objectives set by any of the bird conservation initiatives. The Five Elements comprise a conceptual approach through which conservation partners work together to assess current habitat conditions and ownership patterns, evaluate current species distributions and bird-habitat relationships, and determine where on the landscape sufficient habitat of different types can be delivered for supporting (or optimizing) bird population objectives.

The Five Elements include the following:

1. Landscape characterization and assessment
2. Bird population response modeling
3. Conservation opportunities assessment
4. Optimal landscape design
5. Monitoring and evaluation

The Five Elements Process identifies those species for which habitat within a BCR is a limiting factor, assesses the capacity or habitat base of a BCR to support populations of priority species, and assesses the importance of existing conservation lands. These assessments should generate estimates of how much habitat exists to support each priority species, given specific conditions; the conditions represent testable assumptions, and should be clearly stated along with the all information sources (i.e., the range of values reported) that generated them.

The Five Elements Process assumes that population objectives already have been proposed at a regional level (e.g., at a [BCR](#) scale); the process is intended to facilitate explicit, science-based recommendations on where habitat protection, enhancement, or management would be most efficiently

implemented to achieve those population objectives (Will et al. 2005). However, as noted above the process of stepping down continental population objectives into regional population targets should include feedback loops to evaluate the appropriateness of continental population objectives at the regional and local level. Local and regional assessments of population size and population objectives should feed back up to the continental level to help adjust continental objectives to reflect realities on the ground (Will et al. 2005). At this time, however, there have been no assessments of how appropriate regional population targets are, or what capacity the region has to meet targets stepped-down from continental population objectives. Therefore, we are in the early stages of evaluating, validating, and/or revising population objectives at any scale.

### Next Steps

In BCR 13, developing population and habitat goals is viewed as a desirable but a necessarily long-term endeavor. The BCR 13 Initiative's goal is to use the Five Element Process in an iterative effort to validate and assess the accuracy and the practicality of the population objectives that have already been stepped down for each BCR (e.g., landbirds) before adopting quantitative objectives for the region. In the meantime, this plan and subsequent efforts will identify the priority research and monitoring activities that would be needed to set or refine quantitative objectives, test the assumptions underlying them, and investigate which species are limited by factors other than habitat. It is widely agreed upon that despite the difficulty or controversy associated with obtaining population objectives for priority species, they should not stand in the way of habitat conservation in areas identified as high priorities within the BCR.

## CHAPTER 4.

### **FOCUS AREAS**

Focus areas are important to efficiently and effectively deliver bird habitat conservation by focusing limited resources in key areas. Focus areas are generally thought of as:

1. Regionally important to one (or more) life history stage or seasonal-use period for migratory birds
2. Developed within the context of landscape-level conservation of biodiversity
3. Discrete and distinguishable habitats or habitat complexes demonstrating clear avian importance (i.e. biological/ecological boundaries)
4. Large enough to supply all necessary requirements for survival during the season for which it is important, though small, disjunct areas that are ecologically connected and critical for a population could also be within a focus area. For example, a heron rookery and feeding area may be separated by habitat that is not critical. The rookery and feeding area should be identified as a focus area, but the area between these need not be included in the delineation.

One goal of this plan is to identify and raise the visibility of specific sites or areas that are considered by expert opinion to be important for bird conservation. BCR 13 partners identified a set of approximately 250 discrete (but often overlapping) polygons, which correspond to 156 named focus areas and approximately 50 unnamed polygons (See [Appendix C](#)). Focus areas for BCR 13 were developed independently for each of the major bird initiatives (i.e., waterfowl, waterbird, landbird, and shorebird), by bird experts that attended the BCR 13 workshops in 2001. Focus areas for landbirds, waterbirds, and shorebirds were reviewed by each jurisdiction in the U.S. and Canada. Waterfowl focus areas also have been identified for the U.S. portion of BCR 13 through the [Atlantic Coast Joint Venture's Waterfowl Implementation Plan](#). Though most focus areas were designated by just one of the four initiatives, many key areas were identified by two, three, or even all four bird initiatives. For these overlapping focus areas, exact polygon size and boundaries do not always correspond closely, even for focus areas sharing the same name.

Focus areas range in size from small, discrete sites (e.g., a particular island or beach) to large sites (e.g., military bases), to landscapes that can encompass many different ownerships over several thousand hectares (See maps in [Appendix C](#)). Additional details on BCR 13 Focus areas, including a list of all designated Important Bird Areas in BCR 13 are provided in [Appendix C](#). Work is underway to improve on the map and list of focus areas produced at the 2001 workshops, as some focus areas currently remain without names attached to them or without specific attributes. Therefore, the rationale for originally delineating some focus area (e.g., priority species or habitats associated with the area) is no longer clear. Future updates of the focus area list and map(s) will be posted at the BCR13 website, available through [www.acjv.org](http://www.acjv.org).

#### Limitations

The focus areas identified in this initial BCR 13 bird conservation plan should be viewed as a rough, first-step attempt at identifying some of the region's most important bird habitats. The process used to generate focus areas has important limitations that should be understood by anyone using the maps or list in this plan. The list of focus areas is definitely biased in terms of taxonomic groups, habitats, jurisdictions, and existing knowledge. Not all bird experts in the region attended the BCR 13 workshops in 2001, and some areas were better represented than others. If a given species has been studied by only one or a few biologists, and they did not attend the BCR 13 workshops, then that species may not have been explicitly considered in the current list of focus areas. It is also important to note that not all species within the groups represented by the bird initiatives were considered or included in focus group

planning. For example, American Woodcock habitats were not considered in the delineation of shorebird focus areas, even though woodcock are taxonomically considered as shorebirds. The preliminary focus areas identified in this plan are intended to be important to the balance of species within each group but not for every single species. In other words, the preliminary focus areas represent a “coarse filter approach,” as opposed to a fine filter approach.

Jurisdictions (or parts thereof) with the least representation at the BCR 13 workshops may well contain important bird habitats that are not recognized in this plan. Within a jurisdiction, experts may disagree about exactly which areas are most important. In the spirit of consensus, we tended to be inclusive with focus areas suggested. No attempt was made to verify the importance of each focus areas identified in the 2001 workshops, or to rank them or quantify their relative contributions to different bird species or groups. It is important to consider that due to differences in their ecology, some avian taxa lend themselves to the concept of focus areas better than others. Species that tend to occur in large congregations and/or in relatively open habitats that are easily observed (e.g., shorebirds at beaches or waterfowl in rivers) are likely covered more completely by current focus areas than are species that are secretive, widely dispersed, typically occur in small numbers, or use habitats that are difficult to observe (e.g., closed forests).

Focus areas vary in size, but some of the focus areas identified in this plan encompass a large portion of BCR 13. Having a very large focus area may not be particularly helpful in advancing conservation implementation within its boundaries, as it implies that every part of that area is more or less equally valuable to priority species, which is rarely the case. However, implementation in a given area is sometimes guided by local knowledge or specific information (e.g., bird or habitat surveys) unknown or unavailable to conservation planners working at larger scales (e.g., states or provinces).

### Important Bird Areas

Around the world, partners of [Birdlife International](#) have participated in an effort to identify and protect a network of sites, or Important Bird Areas (IBA), critical for the conservation of the world's birds. In the United States this effort is being led by the [National Audubon Society](#), and carried out through its state offices and various partners. Co-partners for the [IBA Program in Canada](#) are [Bird Studies Canada](#) and [Nature Canada](#) (Formerly the Canadian Nature Federation). IBA programs differ across jurisdictions in terms of the criteria, analyses, and data used to identify sites. Methodologies have evolved over time, and in at least some cases IBA identification is based on objective evaluations that include GIS-based landscape analysis, and attempts to deal with wide-ranging species by identifying landscapes and habitats most likely to be valuable to particular species (e.g., see 2005 IBA book published by [Audubon New York](#)). Official IBAs in the US and Canada were identified independently—both before and after—the workshops that resulted in the list of focus areas in the BCR 13 plan. Therefore, IBAs and focus areas should be viewed as separate but complementary to efforts to conserve birds in this region. Many of the BCR 13 focus areas are recognized as IBAs; larger focus areas may even encompass multiple IBAs, as both IBAs and BCR 13 focus areas vary in scale. Until and unless BCR 13 partners decide to refine the current focus area list (e.g., by objectively evaluating bird and habitat distribution data and producing new maps), IBAs should be considered just as important to regional bird conservation efforts as the focus areas identified in this plan.

### Next Steps

The current list of focus areas for BCR 13 needs further review by partners in each jurisdiction. Some mapped focus areas lack names, or may not be correctly identified as an existing IBA. It may be appropriate to identify subfocus areas within the largest areas, or to identify several specific sites instead



of one large polygon. Ideally, focus areas would be identified through an objective assessment based on reliable data on the distribution of priority species in space and time, the distribution of habitats used, and the relative quality of habitat blocks. In reality, some of these inputs will be difficult to obtain for many species, and most of these parameters are unknown for several species. Future versions of this plan may include an assessment of the relative importance of different focus areas, their current status (e.g., habitats or bird populations associated with them), and profiles of each focus area including its size, habitat type(s), bird resources, ownership patterns, threats, and other information.

Future geographic analyses should target those species that are most appropriately served by a set of focus areas. Species not represented by (or not well served by) any focus area map should be clearly identified, so that alternate approaches to conserving them can be considered. For wide-ranging or relatively common species, the best approach may be to build species-specific models that indicate which parts of the region, which landscape configurations, and/or which management methods are most likely to promote or be important to that species. Ideally, every priority species—or at least the highest priority species—would be associated either with a focus area map for that species (or its habitat suite) or a conservation design product that indicates which landscapes and/or management scenarios would most benefit its population(s). A rigorous coarse-filter approach would include a focus area map for each species-habitat suite, and individual focus area maps for each species thought to require its own map. That is, some species may have distributions that would not be well served by the focus area map for any species-habitat suite; those species should have individual focus area maps or products that serve the same purpose (e.g., decision-support tools).

## **Priority Regions**

In the early stages of conservation planning for BCR 13, three priority regions (See [Figure C1](#)) were identified as the most important areas to advance conservation objectives for all bird species in BCR 13:

- 1) Upper St. Lawrence/ Lake Ontario region
- 2) Lower St. Lawrence/Champlain/Ottawa/Richelieu River region
- 3) Lake Erie/Niagara River region (consisting of three disjunct subregions)

Each is discussed briefly below.

### **Upper St. Lawrence/Lake Ontario**

This region covers eastern Lake Ontario and low-lying area surrounding Lake Ontario and the Upper St. Lawrence River Valley from its outlet northeast along the border with Quebec. The region includes Oneida Lake, but not the Mohawk Valley. Different portions of this region provide high quality habitats for a diverse set of priority species. Cerulean Warbler nests in relatively high numbers in forested wetlands along the Erie barge canal, between Iroquois and Montezuma National Wildlife Refuges, and in upland forests along the Frontenac Axis in Canada. Eastern Lake Ontario islands are important to a number of breeding, staging, and migrating high priority species. Large concentrations of diving ducks are found near the islands, and Bald Eagle uses the area. Much of this region is characterized by large grasslands used by breeding waterfowl and other species. Tributaries into the Upper St. Lawrence are important for waterbirds such as Black Tern, American Bittern, and Least Bittern. Many of the original [palustrine](#) wetlands in this area have changed from diverse [hemi-marsh](#) conditions to dense stands of cattails, because water level manipulations and low levels in the winter prevent ice scouring. This practice is detrimental to some natural processes, like limiting cattail use by muskrats and preventing northern pike spawning. Projects that open up cattail monocultures (e.g., using a cookie cutter) and help restore hemi-marsh conditions would benefit many priority species in this region.

### **Lower St. Lawrence River/Champlain/Ottawa/Richelieu River**

The Lower St. Lawrence River/Champlain/Ottawa/Richelieu River priority region encompasses habitats associated with the eastern sections of the Ottawa River eastward along upper portions of the St. Lawrence River to around Montreal, and the upper portions of Lake Champlain including Mississquoi Bay and the Richelieu River. This area is a natural migration corridor and staging area for many species of migratory birds. It was identified as important to all the initiatives except shorebirds, because this portion of BCR 13 is not particularly important to shorebirds. This area is considered regionally important for shorebirds, and some partners argue that shorebird use of this region would likely increase if more habitat was made available through management activities. However, water levels are very difficult to manipulate in this priority region. Formal agreements are already in place among New York, Vermont, and Quebec, to work in the Lake Champlain area. However, it is difficult to identify current projects because many of the partners are not known to the jurisdictions participating in the BCR 13 Initiative. Partners in this region identified long-term monitoring as a major need, and development in Southern Quebec as a major threat to priority habitats.

### **Niagara River/Lake Erie**

The Niagara River/Lake Erie priority region is made up of three discrete but disjunct subregions. The **Sandusky to St. Clair** subregion is a corridor through the Western Lake Ontario Basin from Sandusky Bay (Ohio) through the western islands, Point Pelee, and the southwestern tip of Ontario, to Lake St. Clair. A large proportion of the original marshes in this subregion have been lost, contributing to a lack of sufficient staging areas for waterfowl. Both the north and south shores of Lake Erie are important concentration areas for migrating landbirds. The widespread loss of [Carolinian forests](#) in Ontario has reduced the quality of stopover habitat for landbirds generally, and breeding habitat for many priority species indigenous to that habitat type. The major goal for this portion of the priority region is to identify and protect remaining wetland and forest blocks with ecological value, and restore habitats (i.e., forest, wetland, and grassland) to enhance migratory stopover capacity for all bird groups, and improve breeding habitat for several high priority species of landbirds and waterbirds. The **Long Point to Presque Isle** subregion is made up of a corridor along the shore of Lake Erie, including adjacent inland areas. This region is also important to both landbirds and waterfowl, though it may concentrate more birds moving east-west than north-south across the lake. Partners in this priority region felt that some work was needed to improve the biological foundation needed to direct conservation work, but that clear needs and priorities had already been identified on both sides of the lake. The **Niagara River Corridor** is a funnel for many species of migratory birds across all the groups and is continentally significant for gulls, terns, and waterfowl, where large numbers of individuals congregate during staging and wintering. Sandspits are an important habitat type in all parts of this priority region, and could be the focus of conservation actions by creating more of this habitat type. More research is needed to determine the interchange of birds between the Niagara River, Long Point, and Presque Isle. However, coordination within this region may be better suited to the Upper Mississippi River/Great Lakes Joint Venture because much of the work needed to be done is in Ohio and Michigan, and many of the birds in this region migrate or winter in the Mississippi Flyway.

Together the three priority regions account for about 17% of the total area of BCR 13. These regions are centers of concentration for many priority species in BCR 13, which use either the agricultural landscape or the extensive wetland complexes within these areas. Each of these priority regions includes many different focus areas. Therefore priority regions were considered the most logical areas for initial efforts to capture funds and generate multi-agency collaboration to benefit the most priority species.

## CHAPTER 5.

### CONSERVATION IMPLEMENTATION

This chapter covers a variety of topics related to conservation implementation, including recognition of threats to birds and habitats in BCR 13, priority actions needed, and strategies to successfully achieve bird conservation in the region. This section of the plan is divided into five subsections:

- A. Threats and limiting factors
- B. Priority actions needed
- C. Strategies for success
- D. Conservation design
- E. Next steps

#### **A. Threats**

There are several broad categories of threats that are detrimental to bird populations in BCR 13, which are listed below. Specific information related to particular species-habitat suites is discussed below under the “Priority Actions Needed” section.

##### ***Habitat Loss & Degradation***

A primary threat for most priority bird species in BCR 13 is the decreasing quantity and quality of habitat available for them during the breeding, migration, and/or wintering season. When fields, forests, or wetlands are converted for use as human housing, industry, or intensive agriculture, they often lose most of their value as bird habitat (i.e., they become unavailable to the vast majority of bird species). Further, the activities, noise, pets, vehicles, buildings, roads, power lines, and other characteristics of anthropogenic land uses often disrupt and decrease the quality of any potential habitats remaining, including lands nearby or adjacent to human developments. The isolation and lack of connectivity of remaining habitat patches lowers their value to many species, as discussed below under **Fragmentation**. Habitat loss and degradation ultimately results from many of the other specific threats identified below.

Populations of many—perhaps most—priority species in BCR 13 may be limited by factors outside the BCR’s boundaries, because most species occur here during migration and not during the breeding season or winter. However, overall populations of priority species and certainly their abundance in BCR 13 will be affected negatively if there is not enough habitat available to them in this region, or if its quality is insufficient. Though many birds naturally occur in high concentrations, especially during migration, forcing many individuals into relatively small habitat patches may often be suboptimal, and lead to higher rates of mortality due to starvation, predation or disease. Habitat quality also is a function of disturbance levels, as human activities can negatively influence survival and reproductive output, including disturbances occurring during migration (Arzel et al. 2006).

As discussed above, many habitats in BCR 13 are much less common (and/or of lower quality) than at other times in the past, while a few have become more common. For example, decades of farmland abandonment in the U.S. and natural succession have resulted in an increase in forest land in the U.S. portion of BCR 13, but a decrease in early-successional habitats, as old fields, shrublands, or young (e.g., sapling or pole-sized) forests have given way to older forests. In BCR 13 the result is a net loss of 2.3 million acres (0.9 M ha) of early-successional habitats since the 1970’s (National Woodcock Conservation Plan, in press). This has resulted in population declines in many bird species dependent upon this habitat type.

Because it is difficult to determine definitively how much habitat is needed to sustain (or restore) populations of priority species, it is desirable to both conserve habitat that birds are currently using and increase the quality of available habitat whenever possible or cost-effective, through management actions. Considering that the vast majority of habitat available to migratory birds in BCR 13 is on private land, the former task is a daunting one and the latter task is likely to affect only a small proportion of the landscape. Fortunately, some habitats (e.g., wetlands) have higher percentages in public ownership and/or some legal protection. However, other habitats (e.g., grasslands) are largely in private ownership, are relatively labor- and cost-intensive to manage, and can quickly become unsuitable to many species due to successional changes.

### ***Fragmentation***

In addition to outright habitat loss, many species are negatively affected by changes in landscape composition that decrease average patch size, increase edges between habitat types, and increase the distance between patches. These landscape changes are collectively referred to as fragmentation. When landscapes become fragmented beyond a certain point, effects on bird communities can be serious and negative, including lower habitat occupancy rates, lower reproductive success, higher nest predation and parasitism rates, and lower adult and juvenile survival (Doherty and Grubb 2001). Many of the different priority habitats in BCR 13 occur within a patchy mosaic of different land uses, so fragmentation is the norm in much of this region. Many agricultural grasslands are now isolated due to adjacent fields changing either to forest (through natural succession due to lack of management) or to croplands for intensive agriculture. Other fields have become house lots. Likewise, remnant forest patches in BCR 13 often are in small, isolated tracts, within fragmented agricultural and/or developed landscapes. Changes in regional landscape composition likely represent an increased level of threat to many migrating birds passing through these landscapes (Newton 2006); reductions in bird populations probably have resulted from the fragmentation of once-continuous habitat.

Many priority species are thought to be area sensitive and do not occupy or breed in patches unless they are of sufficient size, often >1 order of magnitude larger than their territory size. Research from across a bird's range often shows this to be true to varying extents in different parts of the range, depending in part on landscape composition. Research from [Cornell University's Birds in Forested Landscapes](#) research program shows that occupancy of a forest patch by Scarlet Tanager or various thrush species is a function of both the size of the forest patch and the amount of forest cover in the surrounding landscape. In forested landscapes (e.g., >70% of area forested) forest birds will often occupy forests regardless of patch size, whereas in fragmented landscapes (>70% deforested) the same species is likely to be found only in patches of 100 or even 1000 ha.

Suburban expansion or sprawl, urbanization, and second-home development in rural areas all contribute to landscape fragmentation by carving up, isolating, or degrading habitat patches, either directly (e.g., through conversion) or indirectly by increasing stressors such as road density, traffic, noise, or mortality rates due to collisions (e.g., with vehicles, windows, or cell towers) and pets. Therefore, conservation of different bird species should generally be focused on those landscapes containing a high proportion of a particular habitat. For example, grassland bird projects are most likely to be effective in landscapes dominated by agricultural or natural grasslands, and forest bird conservation is most likely to be effective in forested landscapes, or in the largest blocks of forest habitat left in fragmented landscapes.

### ***Agricultural Practices***

Tilling, mowing, pesticide applications, and many other standard agricultural practices can have a direct negative effect on many bird species. Most of BCR 13's major rivers and their tributaries are farmed

along their banks, and these agricultural activities limit the habitat value of these areas for most priority bird species for most of the year. Conversion of pasture to cropland can result in the loss of most grassland bird species. Hayfields support many more grassland bird species than do croplands, but they may also serve as ecological traps by attracting grassland birds to nest there, but then being mowed and destroying the active nests before young are fledged. Abandoning fields (i.e., allowing natural succession) also causes a loss in grassland habitat availability, after a number of years (up to a decade). Agricultural activities cause a great deal of non-point source pollution, through increased sediment, nutrient, and pesticide loads in waterways. These inputs lower water quality, rendering some habitat unsuitable for birds and—perhaps more importantly—decreasing habitat quality by reducing or altering the plant and animal communities that birds use for food and cover. Of course, some priority bird species do benefit from agricultural fields; for example, waterfowl feed in large numbers on waste grain during migration. Likewise, shorebirds in large numbers often use wet, low-lying agricultural fields such as the Pelee onion fields and St. Clair flats of southwestern Ontario. Some of these agricultural areas may be productive for both agriculture and migrating birds. However, sustaining populations of birds that rely on these resources may require conservation agreements with the landowners who manage the fields and monitoring efforts to ensure that management practices (e.g., pesticide use) are not harming birds using the area.

### ***Pollution***

Since all the Great Lakes flow out through Lakes Erie and Ontario, and the St. Lawrence River, those water bodies contain all the polluted outflow from—and thus are generally more polluted than—the other Great Lakes. Pollution, both point and non-point source, is a major threat to ecosystem integrity (Abell et al. 2000). Contamination of wetlands and surrounding areas can affect birds directly through higher mortality rates and significantly lower avian reproductive success (Schwarzbach et al. 2006), or through more subtle, long-term means. For example, normal behavior may be affected such that birds are at a higher risk of predation, or have lower foraging success. Pollution levels in New York Harbor area have been shown to affect the survival and fecundity of herons and other waterbirds and are thought to be the cause of recent population declines.

### ***Water Level Control***

Water levels of most major water bodies in BCR 13 are controlled by dams, which affect the availability and quality (e.g., through its vegetative composition) of adjacent wetlands. Less than 1% of water in the Great Lakes is renewed annually, so increasing withdrawals of water out of the basin could lower water levels and result in greater erosion of shoreline and streams, and increase susceptibility to invasive species and contaminant pollution. Historically, water levels on the St. Lawrence River fluctuated 1-2 m in depth over an approximate 30-year cycle, with a predictable influence on wetland vegetation patterns (Hudon 1997). Currently, water levels are managed to optimize discharge for hydroelectric production, control flooding, and maintain water levels for commercial ship traffic (Hudon 1997). Management for certain activities (e.g., shipping, hydropower) can have serious negative effects on birds, since deeper water conditions are related to a significant decrease in wetland plant species diversity, plant biomass, and especially the surface area occupied by emergent plants. Deeper water conditions strongly favor submerged aquatic plants over emergent vegetation. Studies of Lake St. Pierre over an 80 yr period show that the area of emergent marsh ranged from 144 km<sup>2</sup> (under the lowest water levels) to 85 km<sup>2</sup> (under prevailing conditions) to 29 km<sup>2</sup> (at the highest water levels); plant biomass was reduced to 40% of the maximum when water was highest, with differences almost entirely due to decreased emergent vegetation (Hudon 1997). Controlling water levels on tributaries to the Great Lakes, to reduce ice scouring, has caused productive hemi-marshes to become choked by dense cattail stands, in part through a reduction in muskrat populations. Higher water levels in tributary wetlands would favor muskrat

winter survival, and increase their herbivory on cattails, improving habitat quality for priority bird species.

Ultimately, the long-term fate of wetlands along the St. Lawrence River relies on the availability of a sufficient outflow of water from the Great Lakes and on the maintenance of seasonal changes in water levels (Hudon 1997). The water levels on Lakes Erie and Ontario and the St. Lawrence River are now controlled by an international commission. In 2001 the states and provinces around the Great Lake Basin signed an agreement known as Annex 2001 to protect, conserve, restore, improve, and effectively manage the waters and natural resources of the Great Lakes Basin by minimizing water loss, preventing harm to water quality and quantity, and improving ecosystem health. A framework of binding agreements has been developed in the last five years by stakeholders, known as the [Great Lakes-St. Lawrence River Basin Water Resources Compact](#). The compact would impose restrictions on water depletion from the ecosystem and implement a strong and effective water management plan for use of water within the basin. This agreement is currently pending approval by the state/provincial governments involved. There may be a need for the international water regulatory commission to consider slight seasonal alterations in water levels to better meet the need of shoreline dependent species and to reduce or prevent the establishment of invasive exotic species.

At the site-specific level, dredging and other activities related to navigation (e.g., breakwaters) can be very disruptive to the benthic community, changing the substrate, reducing the biomass of invertebrate prey, and lowering overall habitat quality. Such practices should be carefully considered and/or monitored within Focus Areas and IBAs to ensure that bird habitat quality is maintained and/or mitigation takes place to offset reductions in quality of important habitats.

### ***Invasive Species***

Most invasive plants and animals reduce the availability and quality of native habitats, and these can have major impacts on priority bird species. Natural wetlands across BCR 13 have been invaded by plants like purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*), and these plants have negatively affected bird habitat availability by altering the structure and function of diverse marsh ecosystems, changing nutrient cycles and hydrological regimes. These invasions have greatly reduced the amount and quality of habitat available to Least Bittern and American Bittern and most other rail, waterbird, and waterfowl species that use emergent wetlands. Loosestrife can be effectively controlled now through biocontrol (i.e., releasing insect predators), but it may take decades for a large proportion of native wetland plants to recover. Phragmites can be removed by a combination of manual (e.g., pulling, cutting) and chemical (i.e., herbicide) control. Water chestnut (*Trapa natans*) has invaded Quebec, Vermont, New York, and Pennsylvania, and is now considered a major threat to Lake Champlain. Though control programs for many invasive plant species (including *Phragmites* and water chestnut) are occurring in BCR 13, they are typically expensive, require repeated measures, and ongoing monitoring and removal may be necessary for long-term success. For example, water chestnut was eradicated in the Lake Champlain Basin at least twice in past decades, only to reinfest large areas after control efforts ended. From 1982 to 2003, more than five million US dollars have been spent, and recent annual spending topped \$500,000 in [Vermont](#) alone, but this plant continues to infest large areas of the lake basin. The introduction of Zebra mussels (*Dreissena polymorpha*) and Quagga mussels (*Dreissena bugensis*) into the Great Lakes in the 1980's has altered pelagic and benthic communities in the Great Lakes, including changes in the food chain, and a probable reduction in the overall production of fish in the Great Lakes. However, diving ducks selectively eat larger-sized zebra mussels and congregate in areas where the mussels are abundant. Exotic Mute Swan populations are increasing and expanding within the Great Lakes, particularly in Ontario.

### ***Climate change***

Changes in global climate can potentially affect annual survival through greater mortality in any or all seasons, including winter. Severe weather in spring and summer can increase bird mortality and reduce productivity due to exposure. Dramatic weather patterns can cause or exacerbate changes or extremes in natural insect cycles, potentially reducing the prey base for priority species during the breeding season. Water levels are likely to be affected by ongoing global climate change, with some areas becoming consistently wetter and/or drier than usual, and many areas experiencing floods or droughts with increased frequency.

## **B. Priority Actions Needed**

### ***Science/Monitoring/Evaluation***

Baseline information on population size, density (e.g., variability across specific habitat types or conditions), and geographic distribution for many BCR 13 priority species is either incomplete or poor. A detailed assessment of habitats across the region also is lacking; currently most habitats are mapped at the scale of individual jurisdictions. Most of these maps are out of date (e.g., data >10 years old), have serious accuracy issues (i.e., high error rates), and lack sufficient details regarding habitat condition or structure. A BCR-wide land-use map was produced in 2002 but it suffers from all of the above problems. The lack of quality data layers within and/or across jurisdictions will make it challenging to model priority species, assess landscape capacity to support populations, and design optimal landscapes for sustaining them.

More current and comprehensive baseline data must be obtained through monitoring and research to ground this conservation plan in a firm biological foundation, achieve many of its goals, and measure the success of the BCR 13 Initiative. Many of the research and monitoring needs for specific species or groups of birds have been or are being developed within the bird initiatives, individual jurisdictions (e.g., [State Wildlife Action Plans](#)), or within the bird habitat joint ventures. A number of general needs were stated at BCR 13 workshops and apply to more than one of the bird groups. These include:

- Identify limiting factors for priority species during breeding, migration, staging, and wintering. At a minimum determine which priority species are likely to be limited by habitat quantity and quality in BCR 13 and determine those species for which habitat in BCR 13 is *not likely* to be a limiting factor for their population.
- Determine which priority species are not adequately monitored at the continental and/or regional level, and cooperate in the development of new or improved population monitoring programs for priority species during the appropriate season – breeding, migration, staging, or wintering. Many priority species (e.g., Henslow’s Sparrow, most raptors, secretive marsh birds, nocturnal birds) are not adequately covered by current methods, so basic distributions, population estimates, and trend data are lacking for many of these species. Targeted monitoring programs should be established to understand the status of those species that require them, especially if there is evidence that the species has suffered or is suffering either long-term or dramatic population declines. A comprehensive report on monitoring needs of North American landbirds ([Dunn et al. 2005](#)) indicated that improvements to the Breeding Bird Survey (e.g., more routes run) would benefit the largest number of landbirds in BCR 13 that are currently not monitored adequately.
- Cooperate to fully implement the [Program for Regional and International Shorebird Monitoring \(PRISM\)](#), a cooperative effort aimed at tracking population trends of shorebirds, on the breeding grounds, and in migration and wintering areas, with techniques developed for each.

- Determine the importance of relatively small habitat patches, used during migration (e.g., by shorebirds or landbirds), to avian populations. Is use traditional or opportunistic? Are these habitats limiting? Are contaminants an issue (e.g., for shorebirds or waterbirds)?
- Create [GIS](#) data on distribution, abundance, condition, and ownership of colonial waterbird habitats and colonies to enable more efficient and effective sampling to monitor and evaluate this species group.
- Determine how much habitat is needed. Develop sound population and habitat goals and objectives necessary to sustain bird populations and enable measurements of success.
- Determine where habitat is needed most. Develop habitat evaluation and decision-support tools that help indicate which areas are most likely to support priority species or species-habitat suites, and/or how to optimally allocate different habitats across landscapes. (See [Conservation Design](#) section, below).

To accomplish some of these needs, particularly the last one, will require more research in our region to examine, on a species-specific basis, population distributions across habitat types and population responses to different kinds of habitat conditions and/or management techniques. Examples of specific habitat-response research needed includes:

- how shorebird use, diet, weight gain, and feeding and turnover rates are affected by habitat size, quality, and the development of optimal impoundment management techniques to maximize benefits to shorebirds
- how priority forest birds respond to different silvicultural treatments, and how stand and patch size, or landscape composition affects habitat use; e.g., are Cerulean Warbler densities similar in undisturbed forests versus partially-harvested stands that retain some tall, mature trees
- how priority grassland bird populations and breeding productivity are affected by management regimes and resulting habitat structure, and how this may be affected by the composition of the surrounding landscape
- whether waterbird productivity, or adult survival, at colonies across BCR 13 is affected by contaminant or pollution levels
- Experimental wetland habitat management activities are needed to find cost-effective ways to enhance foraging opportunities for migrating shorebirds, waterfowl, and waterbirds; analyses will be needed to optimize management among priority species

Ideally partners in the BCR 13 Initiative will use an adaptive resource management framework that takes advantage of existing scientific information to build models of bird-habitat relationships, gathers new information to test model assumptions and validate results, and is designed to incorporate future monitoring and research results through ongoing and iterative updates to models and predicted results.

### **State Wildlife Action Plans**

Each of the four U.S. states in BCR 13 recently completed a comprehensive wildlife conservation strategy document, known as their [State Wildlife Action Plan](#). These plans identify the highest conservation needs, for all wildlife species, in each state. The U.S. Fish & Wildlife Service has compiled the monitoring and research needs identified in all of the northeastern states' wildlife action plans. For the four states that fall within BCR 13, a summary of information pertaining to birds is below. Information clearly pertaining to areas outside of BCR 13 was not included.

### **New York**

- Complete an inventory and analysis for high priority species that identifies critical habitats



- Monitor trends of all species of greatest conservation need (hereafter, GCN) associated with early successional forest/shrubland; identify their core habitats; assess forest canopy manipulation as a tool to enhance populations
- Encourage full completion of BBS routes
- Initiate a baseline survey and refine monitoring techniques to better determine abundance and distribution of freshwater marsh nesting birds; inventory breeding sites, and coarsely identify key monitoring locations (migratory staging, molting, wintering areas); investigate important life history aspects (i.e. mate selection, foraging habits), and examine efficacy of artificial nest platforms to improve nesting success; monitor threats, effects of West Nile & other limiting factors to freshwater marsh nesting birds
- Monitor marsh nesting birds, peregrine falcon, and common loon for contaminants (i.e. heavy metals, PCBs, mercury) in adults, juveniles, and eggs
- Inventory potential grassland habitats including species distribution and relative abundance of priority species; develop and implement monitoring program to supplement BBS for grassland birds that are not adequately sampled to determine population trends and evaluate the effectiveness of grassland conservation efforts; monitor effects of specific farming practices on grassland bird populations
- Monitor effects of Double Crested Cormorants on colonial waterbirds
- Investigate population status and factors affecting habitat use and productivity of deciduous/mixed forest breeding birds (i.e. Red-headed Woodpecker, Cerulean Warbler)
- Develop a long-term monitoring program for Golden-winged Warbler that assesses impacts of northward movements and invasion of Blue-winged Warbler
- Monitor population status of forest breeding raptors, including information on number of territorial pairs and reproductive outcome; use telemetry to monitor distributions and identify essential habitats

### **Pennsylvania**

- Improved monitoring of forest-associated birds, including raptors; initiate long-term monitoring program to provide more localized information on abundance, distribution and habitat use of forest-associated bird species
- Conduct monitoring of grassland-nesting birds; develop and implement inventory programs to identify important sites for Henslow's Sparrow and other uncommon, patchily-distributed grassland birds not well monitored by BBS; determine precise habitat/area needs of Henslow's Sparrow and identify demographic factors, assessing characteristics of sites with potential to support source populations; monitor effects of specific farming and management practices on avian productivity
- Population surveys and monitoring of marsh birds and seasonal wetland bird species, including surveys (2-3 yrs) at sites of highest-priority marsh birds to provide baseline data on population distributions and abundance in a given region; use telemetry and banding to monitor their site-fidelity, annual survivorship, lifespan, and age at first breeding
- Develop monitoring strategies for crepuscular bird species, including survey protocols that effectively monitor them during the breeding season and fall migration/staging
- Monitor/manage colonial nesting birds, including food resources and threats at active sites; identify other potential habitats for colonial nesting birds
- Improved monitoring of bog-associated species; e.g., initiate and/or increase participation in more specialized surveys of bog-associated bird species (i.e. Cornell's Birds in Forests Landscapes and the Mountain Birdwatch project) like Olive-sided Flycatcher and other boreal species in appropriate bog habitats; increase monitoring at locations where target species were previously documented
- Status assessments/surveys of conifer associated species;
- Monitor and adaptively manage early-successional forest bird species; develop protocols for monitoring target species of birds dependent on early-successional habitats, and a database of known high-quality early-successional habitat on PA public lands
- Conduct monitoring and complete surveys using current projects (i.e. BBA, IBA) to find new occurrence sites for target bird species; conduct comprehensive surveys of potential habitats for highest priority species to definitively determine status; map occupied locations for future reference and routinely monitor sites shown to host priority bird species; initiate long-term monitoring of target species to gather information on

population demographics, status, distribution and abundance and to swiftly detect population trend information for the purpose of proactively managing target species and habitats

- Comprehensive monitoring of target bird species (i.e. Golden-winged Warbler, American Woodcock) and populations on established woodcock habitat management areas; monitor hunting-related mortality effects on woodcock populations in different regions of the state
- Assess the suitability of habitats for Piping Plover populations and identify potential zones for habitat restoration; develop standardized monitoring protocols to identify occurrences of Piping Plovers in suitable nesting habitat on Presque Isle

## **Vermont**

The Breeding Bird Atlas, Breeding Bird Surveys (NABCI), Common Tern, Important Bird Area, and the Marshbird Monitoring Programs (Audubon), Forest Bird Monitoring Project, Loon Recovery Project, Peregrine Falcon Recovery Program, and many other species-specific programs are already implemented in the state. Other needs include:

- Monitor distribution, abundance, population status, range shifts, and nesting productivity for bird species of greatest conservation need, document occupancy of known and potential nesting sites, and monitor changes in critical habitats in concert with changes in target bird populations; monitor threats and limiting factors (e.g., development, atmospheric pollution, mercury burdens) to populations and habitats of target bird species, including impacts of recreational activities (e.g., aquatic nesting sites)
- Conduct roadside counts of conspicuous bird species of greatest conservation need to generate an index of statewide population trends
- Increase research of basic life history information for bird species of greatest conservation need, and monitor effects of management, disturbance regimes, and invasive plant species on target bird populations
- Initiate a standardized statewide survey for wetland birds of greatest conservation need to establish baseline information on distribution and abundance; conduct volunteer-based survey using standardized, repeatable protocols to collect distribution and relative abundance data at a large number of wetland sites statewide
- Annually monitor known nesting colonies of bird species of greatest conservation need, including disturbance and competition in colonies, and productivity of nesting pairs
- Determine if development or forest succession contributes more to grassland bird habitat loss
- Research on the relative importance of grassland perches and cavity availability to raptors and other species of greatest conservation need
- Establish supplemental BBS-type routes to assess population trends of early successional birds
- Use insectivorous grassland birds as indicators of environmental contaminant levels in farmland
- Band a sample of cliff-nesting birds (e.g., Peregrine Falcon)
- Conduct genetic comparisons between Vermont species of greatest conservation need (e.g., Spruce Grouse) and potential sources for reintroduction
- Continue Vermont's triennial census of Spruce Grouse in Nulhegan Basin
- Conduct Ruffed Grouse drumming survey and small-game hunter survey to establish Ruffed Grouse breeding population trends and harvest levels
- Monitor target bird populations associated with vernal pools and seeps and evaluate effects of development on their populations
- Identify best examples of each habitat type across the state that supports the most birds of greatest conservation need

## **Ohio**

A long-term population monitoring program will be established on at least one focus area within each habitat type. Several representative target species identified in the strategic plan will be surveyed to gauge population responses to focus area management activities while ensuring the highest statistical rigor possible. A population viability model will be developed for the suite of wildlife associated with each of the principal habitat types identified in each of the principal Focus Area Tactical Plans. Population viability estimates of forestland target species will be determined using estimates of abundance from the first phase of the monitoring program with productivity and survival measures from the literature. This modeling effort will help determine the long-term

impact of focus areas on Ohio forestland bird populations in addition to determining needs for site-specific bird demographic data. This portion would begin after the longterm monitoring phase is initiated. This strategy will be employed as the first tier in the evaluation of effectiveness of the Appalachian Foothills Focus Area and Forestland Tactical Plans. Conservation actions for the focus areas will be adapted to meet the desired habitat structure for the area as identified during the monitoring and evaluation phase.

Other priority monitoring, evaluation, and management needs that are underway or should be developed include the following:

- Maintain a GIS database for the Grand River watershed to assess progress and trends of biodiversity survey work in the watershed.
- Gather information using the Ohio Wetland Breeding Bird Survey to obtain population data and breeding locations for Least Bittern and Yellow-crowned Night-heron, to help with conservation of these species.
- Common tern nest monitoring, with an increase in nesting platforms and possible modifications to platforms
- Expanding the wetland breeding bird survey statewide
- Bald Eagle nest monitoring
- Trumpeter Swan nest and production surveys and swan releases designed to induce migratory behavior
- Osprey hacking and nest monitoring
- Statewide monitoring of forest birds
- Efforts to monitor Barn Owls statewide, assessing habitat use by barn owls during the breeding season, and develop radio-tracking techniques to assess barn owl habitat use
- Efforts to monitor Peregrine Falcons statewide
- Provide technical assistance to private landowners who wish to enhance/restore state-listed species and habitat
- Continue surveys of state-listed species on wildlife areas
- Continue and expand GIS applications for all wildlife areas and participation in Ohio's GAP analysis
- Continue analysis of bird banding data
- Continue to trap and relocate wild Northern Bobwhite
- Periodically update the wetland inventory and GIS database to guide habitat, research, and monitoring efforts and examine the sensitivity of wetland-dependent species to wetland size and habitat fragmentation
- Determine the habitat needs of Sandhill Cranes
- Design studies to better assess landscape and field characteristics that contribute to successful habitat management of a variety of species, as GIS mapping is completed
- Develop and strengthen partnerships with the Division of Parks & Recreation, the U.S. Fish & Wildlife Service, interested landowners, and non-governmental organizations interested in conserving island-dependant wildlife
- Provide permanent conservation easements for private lands which currently support or may support state-listed wildlife or their habitat,
- Initiate activities described in the Grassland Habitat and several of the Focus Area Tactical Plans to increase the population of Upland Sandpiper, Henslow's Sparrow, Bobolink, Northern Bobwhite, and other grassland associated bird species
- Evaluate habitats with potential value to Sedge Wrens and grassland sparrows
- Conserve nesting sites of the American Bittern, Least Bittern, King Rail, Black Tern, Sandhill Crane, Sedge Wren, Northern Harrier, Snowy Egret, and Cattle Egret
- Implement a Loggerhead Shrike survey
- Quantify impacts to colonial waterbirds by Double-crested Cormorants
- Assemble available habitat information relating to woodland hawks and warblers
- Monitor and develop a demographic model of grassland birds on surface mines
- Determine the status and management of forest breeding birds in Ohio
- Determine minimum area and habitat requirements of scrub-successional birds

### ***Land Protection/Restoration/Stewardship***

To sustain and restore native bird populations in BCR 13 will require additional land protection, to ensure that landscapes providing the highest quality habitat for priority species continue to supply these

benefits over the long-term. These areas should not be allowed to be developed, degraded, or changed to the point that they are no longer contributing to viable populations of target species. However, active management of public and private lands in BCR 13 is as important as any other conservation activity in the region, because many priority species use successional habitats (e.g., grasslands and shrublands). These habitats must be actively managed to provide benefits to priority bird species, or else they will revert to forest. Maintaining a balance of grasslands, shrublands, and both young and older forests, will require landscape planning both within and across jurisdictions. All grasslands are not equal in terms of their habitat quality for different priority species, so a balance must also be sought in terms of maintaining different kinds of habitat within each of the coarse habitat categories.

Land protection efforts are often a function of localized opportunities that arise somewhat unpredictably (e.g., land sales, funding available). However, this plan identifies many focus areas that are good candidates for more proactive and intensive land protection efforts. Landscapes with a high potential for conservation success should be targeted for multiple efforts by a variety of partners, so that efforts can dovetail synergistically. Isolated projects, scattered across large areas, are likely to be less successful than concentrated project areas that attract and sustain large numbers of individual birds of priority species, and ideally a diverse assemblage of priority species. Conservation planning in BCR 13 should continue to further develop and refine conservation design strategies that identify the most important areas for bird conservation. Conservation groups in those areas can then begin to contact and build relationships with landowners, in order to protect those parts of the landscape that are most valuable and/or most vulnerable.

Restoration activities are badly needed in BCR 13, as many valuable and productive habitats have been completely lost due to incompatible human uses. For example, a high proportion of marshes in many parts of the region have been drained and converted to other land uses. Some of these areas could be restored to provide much of their original habitat capacity over the long-term, and could therefore benefit many priority species. Restoration activities are most likely to be effective when carried out in areas nearby or adjacent to habitats that are known to be productive and/or important to migratory birds. In these cases, the financial investments involved have a high likelihood to pay off in terms of immediate and/or impressive use by target species.

In a climate of limited budgets, some conservationists argue for a strategy that first protects potentially important habitats from development (e.g., through conservation easements), especially areas that were or are known to be important to wildlife, areas that are adjacent to important habitats, and/or those that will serve to buffer important habitats. In the future, when such areas are no longer available or are prohibitively expensive, restoration and/or management could be the primary focus on any areas that are degraded or not reaching their full potential as bird habitat. Therefore, restoration is often viewed as both a short-term activity and a long-term strategy for conservation partners.

Stewardship and management activities on both public and private lands are of the utmost importance for sustaining bird populations in BCR 13. For most habitat types, such as grasslands, shrublands, and forests, a very high percentage of all habitat in the region is found on private lands. Therefore, outreach activities are needed to encourage and guide management by landowners. Programs that fund or share costs for private stewardship activities will be important for maintaining or changing various land-use practices necessary to sustain bird populations. However, due to limited budgets and staff, many lands already in conservation ownership are not managed intensively or regularly to provide specific habitat benefits to priority species. Therefore, there is untapped institutional capacity to improve habitat quality and quantity for many priority species, through greater management activities.

### ***Policy/Outreach***

The long-term success of the BCR 13 Initiative ultimately depends on some degree of public recognition, appreciation, and acceptance of its goals and objectives. Efficient and effective delivery of conservation projects in any given landscape will often involve collaboration with many different conservation groups including local or regional groups such as land trusts. Some potential partners will not be focused on bird conservation *per se*, and will not be aware of the major bird conservation initiatives, the bird habitat joint ventures, and many of the tools and conservation programs mentioned in this plan. Therefore, effective communication to a wide range of potential partners will be vital to the success of the BCR 13 Initiative and its partners. The public in general and landowners specifically must be aware of vulnerable or declining bird populations, should be encouraged to participate in bird conservation efforts, and should be provided with information and tools that can guide them to make decisions that have positive effects on bird populations. Examples of such decisions include:

- Recognizing the importance of stopover habitats as a crucial link in the annual cycle of birds, possibly equal in importance to breeding or wintering habitat in terms of population dynamics
- Delaying hay cuts so that grassland birds can produce at least one early brood each year
- Creating and maintaining a range of different early successional habitats across the landscape through management (e.g., burning, grazing, or cutting of vegetation)
- Pursuing economic alternatives to housing development that maintain bird habitats (e.g., harvesting forests or leasing farmlands)

Most people are unaware of many of the conservation programs and financial incentives that are available to landowners interested in cooperative wildlife conservation activities. Most of these programs rely on voluntary participation of landowners, so partners may have to make a concerted effort to reach those landowners in areas where the program would have the greatest benefits to priority bird species. Often this process begins by setting up demonstration sites that have high visibility to the public. This helps landowners to find out about available programs through their neighbors or other sources that they are more likely to trust, such as local agencies or organizations.

Members of the public and many conservation partners have important roles to play in influencing government policies regarding spending on conservation programs, public and private land use, resource development, management plans for protected areas, and a multitude of other subjects that ultimately relate to bird habitat conservation. While this approach may seem indirect or theoretical compared to “on-the-ground” conservation projects, a concerted effort to influence public policy can have a profound impact on many species. In the past, public awareness and support was instrumental in achieving bans of particular pesticides (e.g., DDT) and reductions in pollutant levels in the Great Lakes, which lead to rebounding populations of some species that had been negatively impacted by these stressors.

### **C. Implementation Strategies**

Achieving the goals and objectives for BCR 13 will require extensive cooperation and partnerships among the various jurisdictions, agencies, organizations, and individuals. Building and enhancing partnerships and regular communication among partners will be necessary to implement many of the actions needed. Various implementation strategies identified for BCR 13 are discussed below, as are strategies specific to particular habitats, suites, or species. A number of programs exist that can assist in securing funds to implement habitat and research projects for priority species (Table 5). Partners recognize the importance of pursuing high priority projects for single species or bird groups, such as

shorebirds or landbirds. Therefore, future projects will not be dictated solely on their contribution to multiple species but also to their contributions to regional biodiversity. In addition, future projects will not solely focus on habitat conservation. Baseline population and habitat information is weak for most of the priority species and needs to be improved to ensure the solid biological foundation necessary to develop sound population and habitat objectives.

Focus areas and Important Bird Areas provide a starting point to implement the goals and objectives of BCR 13 by helping to direct attention, conservation action, management, research, programs, or projects to the areas where the greatest need—or the potential to make the greatest difference—has been identified for priority species. Although focus areas were delineated independently by each bird group, many areas were associated with multiple taxa, creating opportunities for integrated projects that would benefit a broad suite of birds. Important projects can and should be carried out in locations that are not focus areas, for various reasons. First, the focus areas identified do not necessarily reflect a perfectly complete or accurate set of habitats for all priority species. Second, some projects have enough local interest or momentum that they will be carried out regardless of their importance to or input from the bird conservation community. However, such projects likely can have a greater positive impact to birds if such input is provided.

For most of the species-habitat suites, an overall conservation strategy could include the following elements:

- (1) thorough inventory of potential habitats to determine the most important sites for priority species; determine ownership patterns, economic and conservation status, and potential threats
- (2) identification and promotion of management practices that benefit target bird species
- (3) management or incentive programs that promote and encourage land management practices that benefit wildlife
- (4) conservation design strategy that optimizes various competing objectives and determines ideal landscape configuration(s) for priority habitats, and the most important areas to protect or manage to meet bird conservation objectives

## **Habitat-specific Strategies**

### ***Grasslands***

Recent trends in farming show a dramatic increase in farm abandonment—and reforestation—on the U.S. side of the BCR and increasingly intensive agriculture on the Canadian side. Neither of these practices is conducive to maintaining quality habitat for grassland bird species. Partners from across BCR 13 recognize the immediate need for action within this region to maintain the quality and quantity of grassland habitat available to migratory birds.

In landscapes with a high proportion of agricultural grasslands (including recently-abandoned agricultural fields), efforts should be made to:

- Identify as a high priority those grassland areas with presence and/or high densities of priority species (e.g., areas currently supporting Henslow's Sparrows) and/or above-average productivity
- Acquire, protect, and/or ensure sound management (e.g., late-season haying,) of high priority grassland areas and the largest grasslands nearby or adjacent to them

When individual grassland patches are known to host priority species, and/or have high densities and/or productivity, these areas should be recognized and managed to ensure that they continue to contribute to regional populations. Even individual sites (e.g., military or commercial airfields) that are relatively isolated or not in a landscape with abundant grassland patches can be important to regional metapopulations if they serve as a “source.” Source populations produce surplus birds in most years, which can help sustain local populations at other sites which would not otherwise be stable. Population sources are most likely to occur in landscapes with a high proportion of grasslands, but they may also be found in landscapes that are not dominated by agricultural grasslands. Examples of source habitats include very large grassland patches, sites with diverse and/or relatively frequent management practices (e.g., grazing, burning, mowing), sites with low populations of nest predators (e.g., areas where predators are actively managed), areas where hayfields are typically mowed later in the summer (e.g., after July 15) due to weather patterns or soil moisture conditions. There is a lack of basic information on the breeding biology and distribution of many priority species, as limiting factors still are not understood for many species (e.g., Henslow’s Sparrow, Upland Sandpiper).

### ***Shrub/Early Successional Forests***

Abovementioned trends in reforestation in the U.S. and increasingly intensive agriculture in Canada have negatively affected shrubland birds and species that prefer disturbed sites or young forests. Disturbed habitat occurred on perhaps 730,000 ha in pre-colonial New York, but has been reduced to about 370,000 ha and continues to decline (Confer and Pascoe 2003). As the area of shrublands provided by abandoned farmland declines, managed shrublands will play an increasingly significant role in the conservation of this species-habitat suite. In New York, actively managed shrublands currently compensate for some recent losses in shrub habitat. About 6,100 ha of shrubs are managed by state or federal agencies and non-profit organizations, and some 50,000 ha are managed as powerline rights-of-way, much of which is productive habitat for shrub-nesting birds (Confer and Pascoe 2003).

Because shrub habitat occurs along a successional gradient, after grasslands are undisturbed or unmanaged for a period of time, in some areas it may be efficient to manage for shrublands and grasslands as a complex. A shifting mosaic of early successional habitats could include very recently disturbed patches and patches left unmanaged for many (e.g., 10-15) years. This strategy is ideal in landscapes currently composed of agricultural fields, old fields, and regenerating forests. Grassland bird species are likely to be maintained over time only if management or disturbances (e.g., fire) leads to successful establishment of grasses, and if grasslands are of sufficient size to attract species of concern (e.g., >20 ha, ideally 50-100 ha). Many bird species (e.g., American Woodcock, Song Sparrow) will thrive in many different habitats in such a landscape, regardless of whether grass or shrubby species regenerate after disturbance.

Some relatively small areas (e.g., 15 acres) have been intensively managed for grassland birds on public conservation lands such as national wildlife refuges. Because many grassland birds are area-sensitive, patches less than 20 ha (50 acres) may be too small to attract and serve as breeding habitat for most grassland bird species. Many shrubland birds are not considered area-sensitive, so it may be most productive to allow succession to occur and target shrubland birds on such small habitat patches, and focus efforts for grassland birds on larger fields (e.g., >40 ha). Recent reports have indicated that many shrubland bird species prefer larger habitat patches (Confer and Pascoe 2003, Rodewald and Vitz 2005), so management for shrubland birds should include larger habitat patches (e.g., >10 ha), in addition to small patches or rights-of-way.

Efforts are underway to identify population centers for at least one priority species in this suite (i.e., [Golden-winged Warbler Atlas](#) effort), and management for this species would be likely to have a positive effect on the entire suite of priority species using this habitat. Patterns of farmland abandonment should be more closely studied as it might be possible to exploit certain areas and maintain high quality habitats for shrubland bird species. In areas known to host high densities and/or populations of priority shrubland birds, woody succession should be actively discouraged. Management practices currently employed for some key game and wetland species (e.g., American Woodcock, waterfowl) can also provide high-quality habitat for most priority shrubland birds.

John Confer (pers. comm.) found that restored wetlands in Jefferson County, NY, fell into two categories: those with a border of relatively undisturbed habitat, and those with active agriculture that extended to the edge of the wetlands. Five surveyed wetlands with an undisturbed border of 30-50 m on all sides supported far more wildlife than five similarly-restored wetlands with active agriculture approaching the high water line. Buffers that were not currently being managed—or those that had been brush-hogged within 2-3 years—were clearly better than hayfields that were being cut twice per year. Wetland buffers have implications for more than just wetland bird species; many other species like Golden-winged Warbler occupy scrub-shrub wetlands and swamp forests with a moderate understory of shrubs and tussock sedge. In Southern New York, Golden-winged Warbler has very high reproductive success in forested wetlands and little or no hybridization with Blue-winged Warbler, making wetlands an important source habitat for this imperiled species (J. Confer pers. comm.).

### ***Deciduous-Mixed Forest***

An implementation strategy for this habitat suite could include the following elements:

- 1) Identify the most important areas and sites that support or potentially support highest and high priority species (e.g., [Cerulean Warbler](#)).
- 2) Protect and manage existing sites to maximize benefits to priority species (e.g., preserve tallest trees, encourage maturing of canopy species, prevent fragmentation of existing forests).
- 3) Allow and encourage canopy development in potential sites that exist as forest patches or are managed as forested wetlands, to enhance the possible further expansion of priority forest bird species.
- 4) Promote multiple-use strategies (e.g. production of maple syrup, shelterwood silviculture) that are compatible with priority forest species habitat needs on private lands.

In many parts of BCR 13, landscapes with a high proportion of forest cover are dominated by even-aged second-growth forests that are maturing (e.g., 50-75 years old). In these areas, populations and densities of most priority species are likely to be lower than they would be if the landscape had a more diverse assemblage of forest conditions—that is, more forest management. In lieu of natural disturbances, which may be uncommon (e.g., hurricanes) or actively prevented (e.g., fire suppression) timber harvesting may be the only practical way to maintain favorable habitat conditions in the landscape for a diverse assemblage of priority species. Most priority forest species in BCR 13 either benefit from disturbances created by timber harvesting, or they are largely unaffected by it. Brown Thrasher and Rose-breasted Grosbeak reach their highest densities in young, regenerating forests (e.g., regrowing clearcuts) and decline in abundance as forests mature. Wood Thrush, Black-throated Blue Warbler, and Canada Warbler all respond positively to understory vegetation development, as occurs after many timber harvests. Black-billed Cuckoo, and Scarlet Tanager occur in a wide range of forest conditions, including recent partial-harvests and regenerating forests. Baltimore Oriole prefers clearcuts, young forests, and edges over mature forest conditions. Cerulean Warbler and Worm-eating Warbler are typically associated with older, more mature forests, but both may be reported to respond to uneven-aged forest management when tall, canopy trees are retained.



### ***Shoreline Sand/Mud***

Conservation of shoreline sand/mud habitats is largely a function of public policy, as this habitat type is often found on public lands or is affected by policies governing management of public resources (e.g., water levels). There are inevitable conflicts between management for shorebird habitat versus other uses (e.g., hydroelectric power generation). Water level and water quality may be affected by activities that are somewhat remote from a particular site (e.g., dams upstream, field run-off) and governed by public land-use policy in general compared to site-specific management.

Some conservation issues related to this habitat are site-specific. Dredging to maintain shipping channels and other modifications related to navigation (e.g., breakwaters) can have a profound effect on habitat features important to birds, causing long-term changes in the substrate and benthic communities in an area. Protecting particular areas (e.g., a beach) may involve traditional approaches to conservation such as fee purchase or conservation easement. Potential breeding habitat designated for Piping Plover should be monitored, and partners should participate fully in the [recovery plan](#) for this species.

### **Funding Strategies**

#### North American Wetlands Conservation Act (NAWCA)

The U.S. Fish & Wildlife Service North American Wetlands Conservation Act (NAWCA) [Grants Program](#) is a major source of funding for conservation of wetland habitats and associated upland buffers. More than \$20 million in NAWCA funds have already been spent in the U.S. and Quebec portions of BCR 13, and partners are planning to continue using NAWCA funds when possible to protect, restore, or enhance important wetlands. Differences in how Canadian and U.S. projects are funded make it problematic to develop individual projects that span both sides of the international border. However, cross-border communication could establish links between existing or future projects that include nearby projects on either sides of the border.

In the U.S. portion of BCR 13, at least \$5.1 M (US) in NAWCA funds, \$10 M in matching funds and another \$6 M in nonmatch funds have been spent to protect 14,600 (5,900 ha) acres, and restore or enhance 8,000 acres (3240 ha), more than 70% of which was wetlands. In Quebec, \$16.8 M (CDN) has been spent on NAWCA projects, 6,695 ha (16,543 ac) in wetlands and 3,980 ha (9,835 ac) in upland buffers. Canadian NAWCA projects were funded with 25% Canadian funds, and the remaining 75% shared between NAWCA and matching partners (e.g., Ducks Unlimited).

#### Other U.S. Fish and Wildlife Service Grants

The U.S. Fish and Wildlife Service has several programs and [grants](#) that could be helpful to partners in BCR 13. The Partners for Fish and Wildlife program and Landowner Incentive Program (administered jointly by USFWS and state wildlife agencies) both provide support to private landowners interested in wildlife conservation projects, including management, restoration, conservation easements, etc. Competitive grants to individuals, groups, or state agencies include the [National Coastal Wetlands Conservation Grants](#), [Cooperative Endangered Species Conservation Fund](#), [Neotropical Migratory Bird Conservation Fund](#), [State Wildlife Grants](#), and [Landowner Incentive Program](#). See Table 5, below, for a summary of funding options.

**Table 5.** Summary of potential funding sources for priority habitat conservation and research projects in the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region. USFWS = U.S. Fish & Wildlife Service. NOAA = National Oceanic & Atmospheric Administration.

Program	Jurisdiction	Description	Website
North American Wetlands Conservation Act	U.S. & Canada	A USFWS grant program for the acquisition, restoration, and enhancement of wetlands and associated uplands	<a href="http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm">http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm</a>
Neotropical Migratory Bird Conservation Act	U.S., Canada, Latin America	A USFWS grant program for the conservation of Neotropical migratory birds in the U.S., Latin America, and the Caribbean	<a href="http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm">http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm</a>
National Coastal Wetlands Conservation Grants Program	U.S. states & territories	A USFWS grant program for the acquisition and restoration of coastal habitats (includes Great Lakes) and associated uplands	<a href="http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home">http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home</a>
State Wildlife Grants	U.S. states & territories	A USFWS grant program to develop and implement programs that benefit wildlife and their habitats	<a href="http://federalaid.fws.gov/swg/swg.html">http://federalaid.fws.gov/swg/swg.html</a>
Landowner Incentive Program	U.S. states & territories	A USFWS grant program that provides for habitat protection and restoration on private lands for federally listed, proposed, candidate, or at-risk species	<a href="http://federalaid.fws.gov/lip/lip.html">http://federalaid.fws.gov/lip/lip.html</a>
Coastal Estuarine and Land Protection Act	U.S. states	A NOAA grant program to protect important coastal and estuarine areas with significant conservation, recreation, ecological, historical, and aesthetic values threatened by development or conversion	<a href="http://coastalmanagement.noaa.gov/pdf/CELCPfinal02guidelines.pdf">http://coastalmanagement.noaa.gov/pdf/CELCPfinal02guidelines.pdf</a>
Partners for Fish and Wildlife Program	U.S. states	A USFWS program to help provide financial and technical assistance to private landowners for restoration of wetlands and other important habitats	<a href="http://partners.fws.gov/">http://partners.fws.gov/</a>
Fish Enhancement, Mitigation, and Research Fund	Lake Ontario and St. Lawrence River Basin	A fund for enhancing, restoring, or preserving aquatic habitats, and fish research. Established by a Settlement Agreement in the licensing of the St. Lawrence-FDR Power Project near Massena, NY	<a href="http://fws.gov/northeast/nyfo/FMRFfactsheet.pdf">http://fws.gov/northeast/nyfo/FMRFfactsheet.pdf</a>
Great Lakes Watershed Restoration Program	Great Lakes region	A program administered by the National Fish & Wildlife Foundation to support habitat restoration, water quality improvement, watershed planning and management, and applied research on Great Lakes watersheds	<a href="http://www.nfwf.org/AM/Template.cfm?Section=Browse_All_Programs&amp;CONTENTID=4883&amp;TEMPLATE=/CM/ContentDisplay.cfm">http://www.nfwf.org/AM/Template.cfm?Section=Browse_All_Programs&amp;CONTENTID=4883&amp;TEMPLATE=/CM/ContentDisplay.cfm</a>

## D. Conservation Design

As discussed above, in the section on [Population and Habitat Objectives](#), an obvious need of any comprehensive conservation planning effort is to determine *how much* habitat is needed, *where* in the BCR and on the landscape different habitats should be protected, restored, and/or managed, and *what configuration* would best meet the needs of all species or at least a subset of priority species. Future work on the BCR 13 Initiative will include developing better habitat mapping products (e.g., data layers), and better computer models and decision support systems to help design optimal landscapes for priority bird species. For the time being, managers will have to choose between promoting habitats that favor one suite of priority species (e.g., grassland and/or shrubland birds) or another (e.g., mature forest birds). These decisions are best made by considering the landscape context of the parcels or area of interest, and what the cumulative impacts of the various decisions would be. For larger ownerships, it may be possible to manage for multiple suites of priority species in different parts of the landscape.

A pilot project to update and refine habitat maps, particularly grassland and wetland data layers, and identify the most important clusters of habitat patches and landscapes is underway in the New York portion of the St. Lawrence Valley. This effort includes a large and diverse set of partners interested in identifying, protecting, and restoring habitats for many of the BCR 13 priority bird species within that Priority Region. In brief, the project creates data layers based on newer spatial data (i.e., satellite imagery and orthophotos) than were formerly available, and uses that information in a model of Mallard distribution and productivity. Pending satisfactory map validation and available funds, this pilot project could be expanded to include other priority birds in this and other regions. For more detailed results from this work go to Ducks Unlimited's St. Lawrence [webpage](#). Ducks Unlimited-Quebec region is currently working on regional wetland conservation plans for the province, and these were developed as decision support tools for conservation biologists and urban planners.

## E. Next Steps

1. Partners should continue to integrate existing and newly updated information (e.g., more recent satellite image classification) into conservation design efforts that:
  - identify the most important landscapes in BCR 13 for different priority species
  - determine which areas would be most effectively managed or restored, to increase populations of priority species
  - determine the capacity of BCR 13 to support priority species
2. The information above can be used to set realistic population and habitat objectives for BCR 13, and guide future work to secure, restore, and/or protect important habitats within BCR 13. In the meantime, work within and outside of the focus areas identified in this plan is ongoing and should continue to be one of the highest priorities of the BCR 13 Initiative.
3. Within states and provinces, working groups should be established to coordinate the efficient delivery of existing programs that support habitat management for priority species on private lands (e.g., State Wildlife Grants, Landowner Incentive Program, Partners for Fish and Wildlife, and NRCS Farm Bill Programs), to maximize the effectiveness of these programs. The BCR 13 Initiative will likely begin with working groups centered on the three [priority regions](#) identified in this plan, as these are currently considered the highest priority areas for implementation. Within each priority region are many

focus areas and IBAs, which are a logical starting point for efforts to increase protection, buffer and connect important and/or protected areas, and direct or improve management to increase productivity of priority habitats. Some opportunities to protect or manage lands outside of existing focus areas or IBAs will undoubtedly arise, and partners with limited resources will have to weigh their value and future potential for conservation against probability of future opportunities in those areas already identified as being important.

4. Partners should participate in the [northeast coordinated bird monitoring](#) effort, a collaboration to develop a coordinated approach to monitoring avian abundance, distribution, and demographics, and thus strengthen the fundamental basis for science-based bird conservation in the region.

5. Partners should continue their efforts to maintain and expand government policies and programs that address and reduce threats to birds in BCR 13, fund important conservation programs, including monitoring, research, land acquisition, restoration, and management activities.

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To finalize a draft conservation plan and keep the BCR 13 Initiative moving forward, a formal Steering Committee was established to allow input from important partners, and ensure representation from across all jurisdictions and bird initiatives. Members of the Steering Committee also serve as jurisdictional contacts and representatives of the Provinces of Ontario and Quebec, the States of New York, Vermont, Pennsylvania, and Ohio, and the Canadian Wildlife Service and U.S. Fish and Wildlife Service.

**Steering committee members**, including alternates, are listed below alphabetically:

Luc Bélanger (Service Canadien de la Faune, QC), Suzanne Cardinal (Ohio Bird Conservation Initiative), Brigitte Collins (Canadian Wildlife Service, ON), Roger Coup (Pennsylvania Game Commission), Bill Crenshaw (Vermont Fish and Wildlife Department), Randy Dettmers (U.S. Fish and Wildlife Service, MA), Dave Odell (New York DEC), Cynthia Pekarik (Canadian Wildlife Service, ON), Mike Reynolds (Ohio DNR), Ken Ross (Canadian Wildlife Service, ON), Raymond Sarrazin (Service Canadien de la Faune, QC), Julie Simard (Ontario Ministry of Natural Resources), Bryan Swift (New York DEC).

The peer-review of priority species was carried out by the following committees, in consultation with the BCR Coordinator:

Waterfowl: Dave Odell (NYDEC) and Ken Abraham (Ontario Ministry of Natural Resources)

Waterbirds: Chip Weseloh (CWS) and Dave Adams (NYDEC)

Shorebirds: Stephen Brown (Manomet) and Ken Ross (CWS)

Landbirds: Peter Blancher (Bird Studies Canada) and Randy Dettmers (USFWS)

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## APPENDIX A

### Species Prioritization Methods & Raw Data

Refer to Chapter 3, “Priority Species and Habitats” to understand the rationale, approach, and methods used to come up with a single priority species list that integrates information from across all the major bird initiatives, and from continental and regional bird plans. As seen in [Table 1](#), objective decision rules were used to determine which species of birds were considered medium, high, or highest priorities for conservation in BCR 13. The following four tables include the “raw input data” that decision rules were applied to, including modifications made during expert peer review of data. The peer review process did not consist of experts deciding whether or not the suggested priority tiers were appropriate for each species; rather, they examined the input data and modified those parameters when the default values used (e.g., BCR responsibility values found in the regional bird plans) were not considered accurate or currently reflective of conditions in BCR 13.

Additions or changes to the list of priority species will be made periodically (e.g., every 1-2 years) if the need arises. Changes would likely result from a BCR 13 partner or outside bird expert requesting that a change be made, based on the claim that relative to the other species and values considered in the input tables (below), a given input value is not accurate or currently applicable for BCR 13. Those claims are likely to be passed on to taxonomic experts (e.g., the individuals who peer-reviewed the data in the tables below) for comment. If the claim seems reasonable and no additional information is required, then the BCR 13 Steering Committee would be asked to approve the change. On a periodic basis yet to be determined (e.g., every 5-10 years) the entire priority species table will be revisited, and reviewed by a new committee of experts representing each taxonomic group and at least one jurisdictions (each) in Canada and the US. This is likely to occur when the conservation plan itself is formally revisited or updated.

**Table A1. Input data used in species prioritization for waterfowl in BCR 13 conservation plan. Where Priority Tier value departs from what would be suggested by rules (see Table 1 in Chapter 3), an explanation is provided.**

Species	Continental Priority <sup>1</sup>	BCR Resp <sup>2</sup> Breeding	Nonbreed	BCR Con <sup>3</sup> Breeding	Nonbreed	Priority Tier	Rule <sup>4</sup>	Comments or Explanation (below)
American Black Duck	HIGH	MOD HIGH	MOD HIGH	HIGH	HIGH	HIGHEST	a	
Blue-winged Teal	MOD HIGH	MOD LOW		MOD LOW		MEDIUM	g	a.
Canada Goose (Giant)	Above	HIGH	MOD HIGH	HIGH	MODERATE	(OVER)		Leave (b.)
Canvasback	MOD HIGH	MOD LOW	MOD HIGH	MOD LOW	MOD HIGH	HIGH	c	c.
Greater Scaup	MODERATE		MOD HIGH		MOD HIGH	HIGH	b/d	
Lesser Scaup	HIGH		HIGH		HIGHEST	HIGHEST	a	
Long-tailed Duck	MOD HIGH		HIGH		HIGH	HIGHEST	a	
Mallard	HIGH	MOD HIGH	MOD LOW	HIGH	MODERATE	MEDIUM	c	d.
Tundra Swan	MOD LOW		MOD HIGH		MODERATE	HIGH	d	e.
Wood Duck	HIGH	MOD LOW		MODERATE		HIGH	c	f.
Barrows Goldeneye	MOD HIGH	Na	Mod(Assume)	Na	High(assume)	HIGH	b	g.
Common Goldeneye	MOD HIGH	MOD LOW	HIGH	MOD LOW	HIGH	HIGHEST	a	h.
Common Merganser	MOD LOW		MOD HIGH		MODERATE	MEDIUM	i	h.
Northern Pintail	HIGH		MOD LOW		MODERATE	HIGH	g	i.
Redhead	MOD HIGH	MOD LOW	MOD LOW	MOD LOW	MOD LOW	MEDIUM	h	j.
Ring-necked Duck	MODERATE	MOD LOW	MOD LOW	MOD LOW	MOD LOW			k.
White-winged Scoter	MOD HIGH		MOD HIGH		MOD HIGH	MEDIUM	h	l.
Canada Goose (Atl/SJB)	HIGH		HIGH		HIGHEST	HIGHEST	b	
Greater Snow Goose	Above		HIGH		HIGH	(OVER)		Leave (m.)
Mute Swan	Above	Na				(OVER)		

<sup>1</sup>Continental concern category 5 = "highly imperiled," 4 = "species of high concern," 3 = "species of moderate concern," 2 = "species of low concern," 1 = "not at risk."

Above indicates species considered overabundant, above desirable levels.

<sup>2</sup>BCR Responsibility based on species' Area Importance (AI) score in UMWGL Regional shorebird plan and its status (i.e., occurrence) in BCR 13, according to Rules.

<sup>3</sup>BCR 13 Concern assumed to reflect priority in North American Waterfowl Management Plan unless modified by expert input.

<sup>4</sup>See Table 1 in Chapter 3 for description of the rules and corresponding letters.

### Comments and Explanations for Waterfowl Table

- a. BCR concern is moderately high due to popn declines due to habitat loss.
- b. BCR concern assumed to be low since popn are overabundant.
- c. Increasing numbers in winter, high numbers in fall.

d. Changed to MEDIUM due to low-moderate breeding concern and need and because HIGH continental priority based on harvest is mitigated by Black Duck interactions... We won't manage any differently for them based on priority tier anyway...

**Table A1 (Continued).**

- e. Change to HIGH based on Continental Priority being MODERATE actually (harvest is important), absolute popn size being rel tiny (100k birds) and importance of coastal marshes for fall staging.
- f. Change to HIGH based on BCR Resp being Moderate or Moderately High.
- g. Eastern popn disjunct, small; Breeding just north in BCRs 12 and 8, but we may be important for staging. Eastern population is only 2% of the size of the Western population; PIF Tier I species.
- h. Based on nonbreeding season.
- i. Change to HIGH based on nonbreeding responsibility actually being Moderate. Based on nonbreeding season.
- j. Leave on as Medium, assuming moderate across board. Could be dropped depending on whether Mod-Lows seen as LOW.
- k. Based on more low than moderate, across board. Could be MEDIUM if considered Moderate across the board.
- l. Change to MEDIUM based on Moderate BCR concern and Moderate BCR Responsibility.
- m. Species is overabundant. However, BCR responsibility for species is high, which means our region can have an important impact on controlling the population and recovering it if it should ever decline seriously in the future.

**Table A2. Input data used in species prioritization for waterbirds in BCR 13 conservation plan. Where Priority Tier value departs from what would be suggested by rules (see Table 1 in Chapter 3), an explanation is provided.**

Species	Continental Concern <sup>1</sup>	Canadian Concern <sup>2</sup>	BCR Responsibility <sup>3</sup>	BCR Concern <sup>4</sup>	Rule	Priority Tier	Comment or Explanation
American Bittern	--	Moderate	High	High	b	HIGH	
Common Tern	Low	Moderate	Moderate-High	High	b	HIGH	a.
King Rail	--	High	Low	High	e*	HIGH	b.
Little Gull	High		High (Winter)	Moderate	c	HIGH	c.
Black Tern	Moderate	High	Low	High	b	Medium	d.
Black-crowned Night Heron	Moderate	Moderate	Low	Moderate	*	Medium	e.
Common Loon	--	Moderate	Moderate-High	Moderate	h	Medium	
Least Bittern	--	High	Moderate-High	Moderate	h	Medium	f.
Virginia Rail	--	IL	High	Low	k,l	Medium	
Yellow Rail	--	IL	Low	High	e	Medium	
Pied-billed Grebe		IL	Moderate-High	Moderate	h	Medium	g.
Bonaparte's Gull	Moderate	Moderate	High (Winter)	Low?	k,l	Medium	h.
Double-crested Cormorant	Not at risk	Not at risk	High	Low		Overabundant	
Great Black-backed Gull	Not at risk	Not at risk	Low	Low		Overabundant	
Ring-billed Gull	Not at risk	Not at risk	High	Low		Overabundant	
<i>Red-throated Loon*</i>	Moderate (assumed)		Moderate?	Moderate	h	Medium?	i.

<sup>1</sup>Continental concern based on North American Waterbird Conservation Plan

<sup>2</sup>Concern based on Canadian Waterbird Plan (Wings Over Water); “IL” = Information lacking

<sup>3</sup>BCR 13 Responsibility based on occurrence information in UMVGL Waterbird plan and Area Importance (AI) scores.

<sup>4</sup>Initially based on Priority in UMVGL Waterbird Plan

\*Species not formally considered a priority species, pending further investigation of its status and whether priority status is warranted. Information is included here because this species was considered in the review process and its status is not yet determined.

### Comments or Explanation

- a. Continental concern can be considered Moderate because in much of its range species requires constant intensive management or colonies may be lost and even with management they are declining widely.
- b. HIGH priority warranted because BCR concern for this species is highest of all rails in BCR, as this species has declined more than other rail species.
- c. Nonbreeding. Niagara River and Oshawa Second Marsh are two of the most important non-breeding areas on the continent, comprising an average of >20% of the total population
- d. Canadian Concern warrants HIGHEST but not Continental Plan.

- e. Rules indicate that we should drop this species but keeping it as Medium priority is warranted due to concern over conflicts with Double-crested Cormorant, uncertainty as to whether populations truly are stable or increasing, and high annual variation; Ontario has many small colonies and one with 1,000 birds but 9-10 colonies have been lost because of cormorants.
- f. Considered Moderate across the board.
- g. Assume that continental concern is MODERATE due to loss of wetlands, and lack of data
- h. Based on nonbreeding.
- i. Nonbreeding. Based on large numbers migrating through Lake Ontario.

**Table A3** Input data used in species prioritization for shorebirds in BCR 13 conservation plan. Where Priority Tier value departs from what would be suggested by rules (see Table 1 in Chapter 3), an explanation is provided.

<u>Common Name</u>	<u>Cont. Conc.</u> <sup>1</sup>	<u>BCR Resp.</u> <sup>2</sup>	<u>BCR Concern</u> <sup>3</sup>	<u>Priority Tier</u>	<u>Rule</u>	<u>Comment</u>
Piping Plover	5	High	High	HIGHEST	a	
Red Knot	5	Low	Moderate	MEDIUM	e	
Buff-breasted Sandpiper	5	Moderate	Mod to High	HIGH	c	
American Golden-Plover	4	Moderate	Moderate	HIGH	c	
Solitary Sandpiper	4	Moderate	Moderate	HIGH	c	
Upland Sandpiper	4	Low	Mod to High	MEDIUM	e	
Whimbrel	4	Low	Mod to High	MEDIUM	e	
Hudsonian Godwit	4	Low	Moderate	MEDIUM	e	
Marbled Godwit	4	Low	Mod to High	MEDIUM	e	
Sanderling	4	Low	Moderate	MEDIUM	e	
Short-billed Dowitcher	4	High	Mod to High	HIGH	a	Rules said Highest Priority but BCR responsibility only moderate, not high
American Woodcock	4	Moderate	Mod to High	HIGH	c	
Wilson's Phalarope	4	Low	Mod to High	MEDIUM	e	
Black-bellied Plover	3	Moderate	Moderate	MEDIUM	g	
Greater Yellowlegs	3	High	Med High	MEDIUM	d	Rules said High but BCR responsibility & concern only moderate, not high
Semipalmated Sandpiper	3	Moderate	Moderate	MEDIUM	g	
Least Sandpiper	3	High	Moderate	MEDIUM	d	Rules said High but BCR responsibility & concern only moderate, not high
Dunlin	3	High	Moderate	MEDIUM	d	Rules said High but BCR responsibility & concern only moderate, not high
Wilson's Snipe	3	Moderate	Moderate	MEDIUM	g	
Pectoral Sandpiper	2	High	Low	MEDIUM	f	

<sup>1</sup>Continental concern category 5 = "highly imperiled," 4 = "species of high concern," 3 = "species of moderate concern," 2 = "species of low concern," 1 = "not at risk."

<sup>2</sup>BCR Responsibility based on species' Area Importance (AI) score in the UMVGL Regional shorebird plan and status (i.e., occurrence) in BCR 13, according to rules:

AI score 5 and occurrence "M, B, M, or B" then Responsibility = High; AI Score 4 and occurrence "M or B" then Responsibility = High; AI Score 4 and occurrence "M or B" then Responsibility = Medium; AI Score 4 and occurrence "m or b" OR AI Score 3 (with any occurrence value) then Responsibility = Low.

<sup>3</sup>BCR 13 Concern assumed to reflect priority in the UMVGL Regional shorebird plan unless modified by expert input

#### OTHER SPECIES CONSIDERED

<u>Common Name</u>	<u>Cont. Conc.</u> <sup>1</sup>	<u>BCR Resp.</u> <sup>2</sup>	<u>BCR Concern</u> <sup>3</sup>	<u>Priority Tier</u>	<u>Rule</u>	<u>Comment</u>
Ruddy Turnstone	4	Moderate	Moderate		c	Rules said High priority; dropped as AI score not reflective of BCR 13; low occurrence low in BCR 13 justifies keeping it off list
Western Sandpiper	4	Low	Moderate		e	Rules said Medium priority but very low occurrence in BCR 13 justifies keeping it off the priority list
Killdeer	3	High	Moderate		d	Rule said High but very low concern due to widespread occurrence and abundance justifies keeping it off the list
Long-billed Dowitcher	2	High	Low		f	Rules said Medium but very low occurrence in BCR justifies keeping it off list

**Table A4.** Input data used in species prioritization for landbirds in BCR 13 conservation plan. [Partners in Flight species assessment data](#) used as input data, with rules explained below table. For more information on landbird prioritization input, rules, etc., see this [link](#).

<b>Common Name</b>	<b>Continental Concern<sup>1</sup></b>	<b>BCR Responsibility<sup>2</sup></b>	<b>BCR Concern<sup>3</sup></b>	<b>Priority Tier</b>	<b>Rule</b>
Golden-winged Warbler	High	Mod	High	Highest	a
Cerulean Warbler	High	Mod	High	Highest	a
Henslow's Sparrow	High	Mod	High	Highest	a
Wood Thrush	High	Mod	Mod	High	c
Blue-winged Warbler	High	Mod	Mod	High	c
Black-billed Cuckoo	Mod	High	High	High	c
Brown Thrasher	Mod	Mod	High	High	c
Field Sparrow	Mod	Mod	High	High	c
Red-headed Woodpecker	High	Low	High	Medium	e
Canada Warbler	High	Low	High	Medium	e
Short-eared Owl	High	Low	High	Medium	e
Willow Flycatcher	High	High	Low	Medium	j
Prairie Warbler	High	Low	Mod	Medium	g
Bay-breasted Warbler	High	Low	Mod	Medium	g
Worm-eating Warbler	High	Low	Mod	Medium	g
Rusty Blackbird	High	Low	Mod	Medium	g
Bobolink	Low	High	Mod	Medium	i
Baltimore Oriole	Low	High	Mod	Medium	i
Northern Harrier	Low	Mod	High	Medium	f
Northern Flicker	Low	Mod	High	Medium	f
Eastern Meadowlark	Low	Mod	High	Medium	f
Bank Swallow	Low	High	Mod	Medium	i
Rose-breasted Grosbeak	Mod	High	Low	Medium	k
Loggerhead Shrike	Mod	Low *	High	Medium	e
Chimney Swift	Mod	Mod	Mod	Medium	h
Grasshopper Sparrow	Mod	Low	High	Medium	e
Northern Bobwhite	Mod	Low *	High	Medium	e
Prothonotary Warbler	High	Low *	Mod	Medium	g
Black-thrt. Blue Warbler	Mod	Mod	Mod	Medium	h
Scarlet Tanager	Mod	Mod	Mod	Medium	h
Song Sparrow	Low	High	Mod	Medium	i

**Rules** (see [Partners in Flight species assessment data](#) for codes below (i.e., RD, TB)).

<sup>1</sup>Continental Concern: HIGH if on PIF Watch List; else MODERATE if PIF Combined Cont. Score of 12 or 13; else LOW

<sup>2</sup>BCR Responsibility: HIGH if RD=5 and %Pop >5% or if RD=4 and %Pop >25%; else MODERATE if RD>3 and %Pop>1%; else LOW if RD>2; if RD=1, species is only eligible for a Priority Tier if specifically designated as a priority by PIF regional partnership. Where species is High BCR responsibility AND is on PIF Continental Stewardship List, it is Medium priority for Stewardship reasons

<sup>3</sup>BCR Concern: HIGH if TB x 2 + PT > 10; else MODERATE if TB x 2 + PT > 7; else LOW



**Table A5.** Species of Greatest Conservation Need (SGCN) identified in State Wildlife Action Plans for four U.S. states within BCR 13. See end of Table for code descriptions.

Scientific name	Common Name	VT <sup>1</sup>	NY <sup>2</sup>	PA <sup>3</sup>	OH
<i>Accipiter cooperii</i>	Cooper's Hawk	MP	P, SC		x
<i>Accipiter gentilis</i>	Northern Goshawk	MP	P, SC	PV	
<i>Accipiter striatus</i>	Sharp-Shinned Hawk		P, SC	MC	x
<i>Actitis macularia</i>	Spotted Sandpiper				x
<i>Aegolius acadicus</i>	Northern Saw-whet Owl				x
<i>Aimophila aestivalis</i>	Bachman's Sparrow				x
<i>Aix sponsa</i>	Wood Duck				x
<i>Alca torda</i>	Razorbill		x		
<i>Ammodramus caudacutus</i>	Saltmarsh Sharp-tailed Sparrow		P		
<i>Ammodramus henslowii</i>	Henslow's Sparrow	MP	T	HC-RS	x
<i>Ammodramus maritimus</i>	Seaside Sparrow		P, SC		
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	HP	P, SC	MC	x
<i>Anas acuta</i>	Northern Pintail		G		x
<i>Anas Americana</i>	American Widgeon				x
<i>Anas clypeata</i>	Northern Shoveler				x
<i>Anas crecca</i>	Green-winged Teal			PV	x
<i>Anas discors</i>	Blue-winged Teal	MP	P		x
<i>Anas rubripes</i>	American Black Duck	HP	G	MC	x
<i>Anas strepera</i>	Gadwall				x
<i>Aquila chrysaetos</i>	Golden Eagle		E	PV	
<i>Ardea alba</i>	Great Egret		P	PV	
<i>Ardea Herodias</i>	Great Blue Heron	MP		MC	x
<i>Arenaria interpres</i>	Ruddy Turnstone		P		
<i>Asio flammeus</i>	Short-eared Owl	MP	E	IC	x
<i>Asio otus</i>	Long-eared Owl	MP	P	HC	x
<i>Aythya affinis</i>	Lesser Scaup		x		x
<i>Aythya americana</i>	Redhead				x
<i>Aythya marila</i>	Greater Scaup		G		
<i>Bartramia longicauda</i>	Upland Sandpiper	HP	T	IC	x
<i>Bombycilla cedrorum</i>	Cedar Waxwing				x
<i>Bonasa umbellus</i>	Ruffed Grouse	MP	P		x
<i>Botaurus lentiginosus</i>	American Bittern	HP	P, SC	HC	x
<i>Branta bernicla</i>	Atlantic Brant		G		
<i>Bubo virginianus</i>	Great Horned Owl				x
<i>Bubulcus ibis</i>	Cattle Egret		P		x
<i>Bucephala clangula</i>	Common Goldeneye		G		
<i>Buteo lineatus</i>	Red-shouldered Hawk	MP	P, SC	MC	x
<i>Buteo platypterus</i>	Broad-winged Hawk			MC	x
<i>Butorides virescens</i>	Green Heron				x
<i>Calidris alba</i>	Sanderling		P		
<i>Calidris alpina</i>	Dunlin		P		
<i>Calidris canutus</i>	Red Knot		P		
<i>Calidris maritima</i>	Purple Sandpiper		P		
<i>Calidris pusilla</i>	Semipalmated sandpiper		P		
<i>Calonectris diomedea</i>	Cory's Shearwater		x		
<i>Caprimulgus carolinensis</i>	Chuck-will's-widow				x
<i>Caprimulgus vociferus</i>	Whip-poor-will	HP	P, SC	MC	x
<i>Cardinalis cardinalis</i>	Northern Cardinal				x
<i>Carpodacus mexicanus</i>	House Finch				x

<i>Carpodacus purpureus</i>	Purple Finch					x
<i>Catharus bicknelli</i>	Bicknell's Thrush	HP	P, SC			
<i>Catharus fuscescens</i>	Veery	MP				x
<i>Catharus guttatus</i>	Hermit Thrush					x
<i>Catharus ustulatus</i>	Swainson's Thrush				PV	
<i>Catoptrophorus semipalmatus</i>	Willet		P			
<i>Certhia americana</i>	Brown Creeper					x
<i>Chaetura pelagica</i>	Chimney Swift	MP			MC	x
<i>Charadrius melodus</i>	Piping Plover		E		IC	
<i>Charadrius vociferus</i>	Killdeer					x
<i>Chlidonias niger</i>	Black Tern	HP	E		HC	x
<i>Chondestes grammacus</i>	Lark Sparrow					x
<i>Chordeiles minor</i>	Common Nighthawk	HP	P, SC		MC	x
<i>Circus cyaneus</i>	Northern Harrier	HP	T		HC	x
<i>Cistothorus palustris</i>	Marsh Wren				HC	x
<i>Cistothorus platensis</i>	Sedge Wren	HP	T		IC	x
<i>Clangula hyemalis</i>	Long-tailed Duck		x			
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo					x
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	MP	P		MC	x
<i>Colinus virginianus</i>	Northen Bobwhite		x		IC	x
<i>Contopus cooperi</i>	Olive-sided Flycatcher	MP	P		IC	
<i>Contopus virens</i>	Eastern wood-pewee					x
<i>Coragyps atratus</i>	Black Vulture					x
<i>Corvus brachyrhynchos</i>	American Crow					x
<i>Coturnicops noveboracensis</i>	Yellow Rail		x			
<i>Cyanocitta cristata</i>	Blue Jay					x
<i>Cygnus buccinagor</i>	Trumpeter Swan					x
<i>Cygnus columbianus</i>	Tundra Swan				RS*	
<i>Dendroica caerulescens</i>	Black-throated Blue Warbler	MP	P		MC	x
<i>Dendroica castanea</i>	Bay-breasted Warbler	MP	P			
<i>Dendroica cerulea</i>	Cerulean Warbler	MP	P, SC		HC-RS	x
<i>Dendroica discolor</i>	Prairie Warbler	MP	x		MC	x
<i>Dendroica dominica</i>	Yellow-throated Warbler					x
<i>Dendroica fusca</i>	Blackburnian Warbler				MC	x
<i>Dendroica magnolia</i>	Magnolia Warbler					x
<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	MP				x
<i>Dendroica petechia</i>	Yellow Warbler					x
<i>Dendroica pinus</i>	Pine Warbler					x
<i>Dendroica striata</i>	Blackpoll Warbler	MP			PV	
<i>Dendroica tigrina</i>	Cape May Warbler		P			
<i>Dendroica virens</i>	Black-throated Green Warbler				MC	x
<i>Dolichonyx oryzivorus</i>	Bobolink	MP	P		MC	x
<i>Dryocopus pileatus</i>	Pileated Woodpecker					x
<i>Dumetella carolinensis</i>	Gray Catbird					x
<i>Egretta caerulea</i>	Little Blue Heron		P			x
<i>Egretta thula</i>	Snowy Egret		P			x
<i>Egretta tricolor</i>	Tricolored Heron		P			
<i>Empidonax alnorum</i>	Alder Flycatcher				MC	x
<i>Empidonax flaviventris</i>	Yellow-bellied Flycatcher				PV	
<i>Empidonax minimus</i>	Least Flycatcher					x
<i>Empidonax traillii</i>	Willow Flycatcher		P		MC	x
<i>Empidonax virescens</i>	Acadian Flycatcher				MC	x

<i>Eremophila alpestris</i>	Horned Lark		P, SC		
<i>Euphagus carolinus</i>	Rusty Blackbird	MP	P		
<i>Falcipecten canadensis</i>	Spruce Grouse	HP	E		
<i>Falco peregrinus</i>	Peregrine Falcon	HP	E	HC	x
<i>Falco sparverius</i>	American Kestrel	MP			
<i>Fulica americana</i>	American Coot			MC	x
<i>Gallinago delicata</i>	Wilson's Snipe			MC	
<i>Gallinago gallinago</i>	Common Snipe				x
<i>Gallinula chloropus</i>	Common Moorhen			MC	x
<i>Gavia immer</i>	Common Loon	HP	P, SC		
<i>Gavia stellata</i>	Red-throated Loon		P		
<i>Geothlypis trichas</i>	Common Yellowthroat				x
<i>Grus canadensis</i>	Sandhill Crane				x
<i>Guiraca caerulea</i>	Blue Grosbeak				x
<i>Haematopus palliatus</i>	American Oystercatcher		P		
<i>Haliaeetus leucocephalus</i>	Bald Eagle	HP	T	HC	x
<i>Helmitheros vermivorus</i>	Worm Eating Warbler		P	RS	x
<i>Hirundo rustica</i>	Barn Swallow				x
<i>Histrionicus histrionicus</i>	Harlequin Duck		P		
<i>Hylocichla mustelina</i>	Wood Thrush	MP	P	RS	x
<i>Icteria virens</i>	Yellow-breasted Chat		P, SC	MC	x
<i>Icterus galbula</i>	Baltimore Oriole				x
<i>Icterus spurius</i>	Orchard Oriole				x
<i>Ixobrychus exilis</i>	Least Bittern	HP	T	PV	x
<i>Junco hyemalis</i>	Dark-eyed Junco				x
<i>Lanius ludovicianus</i>	Loggerhead Shrike		E	IC	x
<i>Larus argentatus</i>	Herring Gull				x
<i>Larus atricilla</i>	Laughing Gull		P		
<i>Larus delawarensis</i>	Ring-billed Gull				x
<i>Larus minutus</i>	Little Gull		x		
<i>Larus philadelphia</i>	Bonaparte's Gull		x		
<i>Larus thayeri</i>	Thayer's Gull		x		
<i>Laterallus jamaicensis</i>	Black Rail		E		x
<i>Limnodromus griseus</i>	Short-billed Dowitcher		P		
<i>Limosa fedoa</i>	Marbled Godwit		P		
<i>Limosa haemastica</i>	Hudsonian Godwit		P		
<i>Lophodytes cucullatus</i>	Hooded Merganser				x
<i>Loxia curvirostra</i>	Red Crossbill			PV	
<i>Megascops asio</i>	Eastern Screech-owl				x
<i>Melanerpes carolinus</i>	Red-bellied Woodpecker				x
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker		P, SC	MC	x
<i>Melanitta fusca</i>	White-winged Scoter		x		
<i>Melanitta nigra</i>	Black Scoter		x		
<i>Melanitta perspicillata</i>	Surf Scoter		x		
<i>Meleagris gallopavo</i>	Wild Turkey				x
<i>Melospiza georgiana</i>	Swamp Sparrow				x
<i>Mniotilta varia</i>	Black-and-White Warbler				x
<i>Myiarchus crinitus</i>	Great Crested Flycatcher				x
<i>Numenius phaeopus</i>	Whimbrel		P		
<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron		P	PV	x
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	MP	P	PV	x
<i>Oporornis formosus</i>	Kentucky Warbler		x	MC	x

<i>Oporornis philadelphia</i>	Mourning Warbler					x
<i>Oxyura jamaicensis</i>	Ruddy Duck		P	MC		x
<i>Pandion haliaetus</i>	Osprey	MP	P, SC	PV		x
<i>Parula americana</i>	Northern Parula					x
<i>Parus atricapillus</i>	Black-capped Chickadee					x
<i>Parus carolinensis</i>	Carolina Chickadee					x
<i>Passerculus sandwichensis</i>	Savannah Sparrow					x
<i>Perisoreus canadensis</i>	Gray Jay	MP				
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow					x
<i>Phalacrocorax auritus</i>	Double-crested Cormorant					x
<i>Phalaropus lobatus</i>	Red Necked Phalarope		P			
<i>Phalaropus tricolor</i>	Wilson's Phalarope					x
<i>Phasianus colchicus</i>	Ring-necked Pheasant					x
<i>Pheuctitus ludovicianus</i>	Rose-breasted Grosbeak					x
<i>Picoides arcticus</i>	Black-backed Woodpecker	MP				
<i>Picoides pubescens</i>	Downy Woodpecker					x
<i>Picoides tridactylus</i>	Three-Toed Woodpecker		P			
<i>Picoides villosus</i>	Hairy Woodpecker					x
<i>Pipilo erythrophthalmus</i>	Eastern Towhee					x
<i>Piranga olivacea</i>	Scarlet Tanager		P	RS		x
<i>Piranga rubra</i>	Summer Tanager			HC		x
<i>Plegadis falcinellus</i>	Glossy Ibis		P			
<i>Pluvialis dominica</i>	American Golden-plover		P			
<i>Pluvialis squatarola</i>	Black-bellied Plover		P			
<i>Podiceps auritus</i>	Horned Grebe		P			
<i>Podilymbus podiceps</i>	Pied-billed Grebe	HP	T	MC		x
<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher					x
<i>Poocetes gramineus</i>	Vesper Sparrow	HP	P, SC			x
<i>Porzana carolina</i>	Sora	MP		MC		x
<i>Progne subis</i>	Purple Martin	HP				x
<i>Protonotaria citrea</i>	Prothonotary Warbler		x	HC		x
<i>Puffinus gravis</i>	Greater Shearwater		x			
<i>Quiscalus quiscula</i>	Common Grackle					x
<i>Rallus elegans</i>	King Rail		T	PV		x
<i>Rallus limicola</i>	Virginia Rail			HC		x
<i>Riparia riparia</i>	Bank Swallow			MC		x
<i>Rynchops niger</i>	Black Skimmer		P, SC			
<i>Sayornis phoebe</i>	Eastern Phoebe					x
<i>Scolopax minor</i>	American Woodcock	MP	G	MC		x
<i>Seiurus aurocapillus</i>	Ovenbird					x
<i>Seiurus motacilla</i>	Louisiana Waterthrush		P	RS		x
<i>Seiurus noveboracensis</i>	Northern Waterthrush					x
<i>Setophaga ruticilla</i>	American Redstart					x
<i>Somateria mollissima</i>	Common Eider		G			
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker					x
<i>Spiza americana</i>	Dickcissel		X	HC		x
<i>Spizella pallida</i>	Clay-colored Sparrow					x
<i>Spizella passerina</i>	Chipping Sparrow					x
<i>Spizella pusilla</i>	Field Sparrow	MP				
<i>Sterna antillarum</i>	Least Tern		T			
<i>Sterna caspia</i>	Caspian Tern		P			
<i>Sterna dougallii</i>	Roseate Tern		E			

<i>Sterna forsteri</i>	Forster's Tern		P		
<i>Sterna hirundo</i>	Common Tern	HP	T	PV	x
<i>Sterna nilotica</i>	Gull-billed Tern		P		
<i>Strix varia</i>	Barred Owl				x
<i>Sturnella magna</i>	Eastern Meadowlark	MP	P	MC	x
<i>Sturnella neglecta</i>	Western Meadowlark				x
<i>Tachycineta bicolor</i>	Tree Swallow				x
<i>Thryomanes bewickii altus</i>	Bewick's Wren				x
<i>Thryothorus ludovicianus</i>	Carolina Wren				x
<i>Toxostoma rufum</i>	Brown Thrasher	MP	P	MC	x
<i>Tringa flavipes</i>	Lesser Yellowlegs	MP			
<i>Tringa melanoleuca</i>	Greater Yellowlegs		P		
<i>Tringa solitaria</i>	Solitary Sandpiper			MC	
<i>Troglodytes troglodytes</i>	Winter Wren			MC	x
<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper		P		
<i>Turdus nigratorius</i>	American Robin				x
<i>Tyrannus tyrannus</i>	Eastern Kingbird				x
<i>Tyto alba</i>	Barn Owl	MP	P	MC	x
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	HP	P, SC	HC-RS	x
<i>Vermivora peregrina</i>	Tennessee Warbler		P		
<i>Vermivora pinus</i>	Blue-winged Warbler	MP	P	RS	x
<i>Vireo bellii</i>	Bell's Vireo				x
<i>Vireo flavifrons</i>	Yellow-throated Vireo			MC	x
<i>Vireo gilvus</i>	Warbling Vireo				x
<i>Vireo griseus</i>	White-eyed Vireo				x
<i>Vireo olivaceus</i>	Red-eyed Vireo				x
<i>Vireo solitarius</i>	Blue-headed Vireo			MC	x
<i>Wilsonia canadensis</i>	Canada Warbler	HP	P	MC	x
<i>Wilsonia citrina</i>	Hooded Warbler				x
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird				x
<i>Zenaida macroura</i>	Mourning Dove				x

<sup>1</sup> HP = High priority; MP = Medium priority

<sup>2</sup> State protected status: P = Protected, E = Endangered, T = Threatened, G = Gamebird, SC = Special Concern; if included in SGCN list with no designations, it is marked with an "x"

<sup>3</sup>From highest to lowest concern: IC = Immediate concern; HC = High level of concern; RS = Responsibility species; PV = Vulnerable; MC = Maintenance concern

## APPENDIX B

### Conservation Plans Relevant to BCR 13

#### Continental, National, & Regional Plans

Plans for each of the bird initiatives are listed below, with continental or national plans listed first, followed by regional plans and/or plans for individual provinces or states.

#### Shorebirds

Canadian Shorebird Conservation Plan

[http://www.cws-scf.ec.gc.ca/publications/spec/cscp/cont\\_e.cfm](http://www.cws-scf.ec.gc.ca/publications/spec/cscp/cont_e.cfm)

United States Shorebird Conservation Plan

<http://www.fws.gov/shorebirdplan/USShorebird.htm>

Ontario Shorebird Plan

<http://www.on.ec.gc.ca/wildlife/plans/shorebirdplan-e.html>

Upper Mississippi Valley/Great Lakes Regional Shorebird Conservation Plan

<http://www.fws.gov/shorebirdplan/RegionalShorebird/RegionalPlans.htm>

American Woodcock (*see below*)

#### Waterbirds

Waterbirds for the Americas: North American Waterbird Conservation Plan

<http://www.waterbirdconservation.org/pubs/ContinentalPlan.cfm>

Wings over Water: Canada's Waterbird Conservation Plan

<http://www.cws-scf.ec.gc.ca/publications/wow/Wings-EN-2003.pdf>

**Upper Mississippi Valley Great Lakes Waterbird Conservation Plan**

<http://www.fws.gov/birds/waterbirds/UMVGL/>

Quebec's Waterbird Conservation Plan

<http://www.qc.ec.gc.ca/faune/icoan-nabci/PlanDeConservationDesOiseauxAquatiquesDuQuebec.en.pdf>

#### Landbirds

North American Landbird Conservation Plan

[http://www.partnersinflight.org/cont\\_plan/default.htm](http://www.partnersinflight.org/cont_plan/default.htm)

Partners in Flight Bird Conservation Plan for Lower Great Lakes Plain (Physiographic Area 15)

[http://www.blm.gov/wildlife/plan/pl\\_15\\_10.pdf](http://www.blm.gov/wildlife/plan/pl_15_10.pdf)

Partners in Flight Bird Conservation Plan for St. Lawrence Plain (Physiographic Area 18)

[http://www.blm.gov/wildlife/plan/pl\\_18\\_10.pdf](http://www.blm.gov/wildlife/plan/pl_18_10.pdf)

Quebec's Landbird Conservation Plan

<http://www.qc.ec.gc.ca/faune/icoan-nabci/StrategieDeConservationDesOiseauxTerrestresDuQuebec.en.pdf>

Ontario BCR 13 Landbird Conservation Plan

<http://www.bsc-eoc.org/PIF/PIFOBCR13PlanFeb2006.pdf>

#### Waterfowl

North American Waterfowl Management Plan (2004 Update)

<http://www.fws.gov/birdhabitat/NAWMP/Planstrategy.shtm>

Atlantic Coast Joint Venture Waterfowl Implementation Plan (2005 Revision)

[http://www.acjv.org/acjv\\_publications.htm](http://www.acjv.org/acjv_publications.htm)

#### Other Plans of Interest

National Woodcock Plan (Approved 2006, to be published in 2007, available through [WMI](#))

The Report on Habitat and Land Use in the St. Lawrence Valley, which describes the distribution of habitats in the St. Lawrence Valley: [http://www.qc.ec.gc.ca/faune/bilan/html/bilan\\_e.html](http://www.qc.ec.gc.ca/faune/bilan/html/bilan_e.html)  
Conservation Atlas of Wetlands in the St. Lawrence Valley  
[http://www.qc.ec.gc.ca/faune/atlasterreshumides/html/atlasterreshumides\\_e.html](http://www.qc.ec.gc.ca/faune/atlasterreshumides/html/atlasterreshumides_e.html)

Conservation Atlas of Woodlands in the St. Lawrence Valley  
[http://www.qc.ec.gc.ca/faune/atlas/html/atlas\\_e.html](http://www.qc.ec.gc.ca/faune/atlas/html/atlas_e.html)

Conserving Forest Corridors in an Agricultural Environment  
[http://www.qc.ec.gc.ca/faune/corridors\\_verts/html/corridors\\_verts\\_e.html](http://www.qc.ec.gc.ca/faune/corridors_verts/html/corridors_verts_e.html)

The Lake Champlain Basin Program <http://www.lcbp.org/> produced a Management Plan entitled “Opportunities for Action: An Evolving Plan for the Lake Champlain Basin” (available online at <http://www.lcbp.org/viewofa.htm>), and other publications and fact sheets.

The Lake Champlain Ecosystem Team (<http://www.fws.gov/r5lcfwro/>) consists of various U.S. Fish & Wildlife Service programs working with partner agencies and NGOs to protect, enhance and conserve fish and wildlife resources in the Lake Champlain watershed for the public benefit by managing Fish and Wildlife Service lands, supporting fish and wildlife restoration, providing technical expertise in fish and wildlife conservation and management, enhancing interagency cooperation and partnerships and better informing the public about fish and wildlife resource issues. The Ecosystem Team has a five-year management plan:  
<http://www.fws.gov/r5lcfwro/LCET5-yearplan.pdf>

**Table B1.** Population Estimates and Population Objectives for BCR 13. Population estimates are reproduced from the various bird initiatives and plans (above). Column labeled “Com” refers to comments below. SLRE refers to published estimates for Saint Lawrence region.

<u>Species</u>	<u>Initiative</u>	<u>Priority</u>	<u>Objective</u>	<u>Com</u>	<u>US &amp; Canada</u>	<u>Canada</u>	<u>Atlantic/ Eastern Flyway</u>	<u>BCR 13 Population Estimate</u>	<u>SLRE</u>
Baltimore Oriole	Landbird	Medium	Increase 50%		6,000,000			422,723	
Bank Swallow	Landbird	Medium	Increase 10%		81,880,000			713,176	
Bay-breasted Warbler	Landbird	Medium	Increase 50%		3,100,000			6,260	
Black-billed Cuckoo	Landbird	High	Increase 50%		1,100,000			69,779	
Black-thr. Blue Warbler	Landbird	Medium	Maintain		2,000,000			47,087	
Blue-winged Warbler	Landbird	High	Increase 50%		390,000			37,358	
Bobolink	Landbird	Medium	Increase 50%		11,000,000			2,159,750	
Brown Thrasher	Landbird	High	Increase 50%		7,300,000			116,068	
Canada Warbler	Landbird	Medium	Increase 50%		1,400,000			8,946	
Cerulean Warbler	Landbird	Highest	Increase 100%		560,000			23,619	
Chimney Swift	Landbird	Medium	Increase 50%		15,000,000			381,005	
Eastern Meadowlark	Landbird	Medium	Increase 100%		8,000,000			247,830	
Field Sparrow	Landbird	High	Increase 100%		8,200,000			235,148	
Golden-winged Warbler	Landbird	Highest	Increase 100%		210,000			9,516	
Grasshopper Sparrow	Landbird	Medium	Increase 100%		13,950,000			46,930	
Henslow's Sparrow	Landbird	Highest	Increase 100%		79,000			2,240	
Loggerhead Shrike	Landbird	Medium	Increase 100%		3,696,000			562	
Northern Bobwhite	Landbird	Medium	Increase 100%		7,544,000			7,892	
Northern Flicker	Landbird	Medium	Increase 50%		14,560,000			243,616	
Northern Harrier	Landbird	Medium	Increase 50%		455,000			7,718	
Prairie Warbler	Landbird	Medium	Increase 50%		1,400,000			5,011	
Prothonotary Warbler	Landbird	Medium	NA		1,800,000			NA	
Red-hd. Woodpecker	Landbird	Medium	Increase 100%		2,500,000			16,396	
Rose-breast. Grosbeak	Landbird	Medium	Increase 50%		4,600,000			238,180	
Rusty Blackbird	Landbird	Medium	Increase 100%		2,000,000			6,196	
Scarlet Tanager	Landbird	Medium	Maintain		2,200,000			88,954	
Short-eared Owl	Landbird	Medium	Increase 100%		696,000			372	
Song Sparrow	Landbird	Medium	Increase 50%		52,920,000			3,938,632	
Willow Flycatcher	Landbird	Medium	Increase 50%		3,300,000			211,243	
Wood Thrush	Landbird	High	Increase 50%		14,000,000			781,145	
Worm-eating Warbler	Landbird	Medium	Increase 10%		750,000			2,537	



**Table B1 (Continued).** Population Objectives for BCR 13.

<u>Species</u>	<u>Initiative</u>	<u>Priority</u>	<u>Objective</u>	<u>Com</u>	<u>US &amp; Canada</u>	<u>Canada</u>	<u>Atl./East Flyway</u>	<u>BCR 13 Popn. Est.</u>	<u>SLRE</u>
Piping Plover	Shorebird	Highest	Increase		5,813	2,110	2,612-2,900	NA	
Buff-breast. Sandpiper	Shorebird	High	150,000	1	15,000	15,000	590	NA	
American Gold.-Plover	Shorebird	High	Increase**	2	150,000	150,000	15,000*	NA	2,874
Solitary Sandpiper	Shorebird	High	Increase		4,000-25,000	4,000-25k	1,500*	NA	244
Short-billed Dowitcher	Shorebird	High	NA		150k-320,000	150k-320k	112,300	NA	
American Woodcock	Shorebird	High	382,541	3			56,000*	283,580	119
Red Knot*	Shorebird	Medium		4	400,000	256,000	145,000**	NA	
Upland Sandpiper	Shorebird	Medium	470,000*	5	350,000	10,000	500**	NA	182
Whimbrel	Shorebird	Medium	105,000		40k-57,000	40k-57k	3,100*	NA	1,394
Hudsonian Godwit	Shorebird	Medium	**	6	49k-50,000	49k-50k	11,000*	NA	321
Marbled Godwit	Shorebird	Medium	Increase 35-50%		171,500	103,000	680	NA	
Sanderling	Shorebird	Medium	1,500,000	7	300,000	300,000	99,000	NA	
Wilson's Phalarope	Shorebird	Medium	2,800,000		1,500,000	680,000	800	NA	
Black-bellied Plover	Shorebird	Medium	363,600		200,000	200,000	26,900*	NA	24,959
Greater Yellowlegs	Shorebird	Medium	**	8	100,000	100,000	23,100*	NA	4,248
Semipalm. Sandpiper	Shorebird	Medium	8,200,000		3,500,000	3,500,000	994,600*	NA	211,525
Least Sandpiper	Shorebird	Medium	1,400,000		600,000	600,000	101,900*	NA	6,662
Dunlin	Shorebird	Medium	Increase		850k-1,525,000	775,000	132,000*	NA	16,167
Wilson's Snipe	Shorebird	Medium			NA	NA		NA	1,225
Pectoral Sandpiper	Shorebird	Medium	**	9	400,000	400,000	62,200*	NA	4,248
American Bittern	Waterbird	High	Increase*	10				NA	
Common Tern	Waterbird	High	Increase*	11				>6,484	
King Rail	Waterbird	High	Increase**	12				32*	
Little Gull	Waterbird	High	NA					NA	
Black Tern	Waterbird	Medium	4,600-5k pairs	13				2085-2144	
Black-crn. Night Heron	Waterbird	Medium	4500 pairs					>2,976 pair	
Common Loon	Waterbird	Medium	Maintain					310 pair	
Least Bittern	Waterbird	Medium	Increase*	14				NA	
Virginia Rail	Waterbird	Medium	Increase*	15				18800-	
Yellow Rail	Waterbird	Medium	Increase*	16				70	
Pied-billed Grebe	Waterbird	Medium	NA	17				NA	
Bonaparte's Gull	Waterbird	Medium	NA					NA	
Red-throated Loon (?)	Waterbird	Medium	NA					NA	

**Table B1 (Continued).** Population Objectives for BCR 13.

<u>Species</u>	<u>Initiative</u>	<u>Priority</u>	<u>Objective</u>	<u>Com</u>	<u>US &amp; Canada</u>	<u>Canada</u>	<u>Atl./East. Flyway</u>	<u>BCR 13 Popn. Est.</u>	<u>SLRE</u>
American Black Duck	Waterfowl	Highest	Increase	18	533,000*	35,000	219,949**	NA	
Canada Goose (At/SB)	Waterfowl	Highest	Maintain		250,000			NA	
Common Goldeneye	Waterfowl	Highest	NA					NA	
Lesser Scaup	Waterfowl	Highest	NA					NA	
Long-tailed Duck	Waterfowl	Highest	NA					NA	
Barrows Goldeneye	Waterfowl	High	NA					NA	
Canvasback	Waterfowl	High	Maintain	19	657,000		97,639**	NA	
Greater Scaup	Waterfowl	High	NA					NA	
Northern Pintail	Waterfowl	High	Increase	20	2,815,000		50,760**	NA	
Tundra Swan (Eastern)	Waterfowl	High	Maintain		103,400			NA	
Wood Duck	Waterfowl	High	NA					NA	
Blue-winged Teal	Waterfowl	Medium	NA					NA	
Common Merganser	Waterfowl	Medium	NA					NA	
Greater Snow Goose	Waterfowl	Medium	Maintain		702,700			NA	
Mallard	Waterfowl	Medium	Maintain	21	8,640,000	107,500	169,471**	NA	
Redhead	Waterfowl	Medium	Maintain	22	811,000		108,143**	NA	
White-winged Scoter	Waterfowl	Medium	NA					NA	

Additional waterfowl population goals for Canadian portion of BCR 13 (M. Gloutney, pers. comm.) are as follows:

<b>Species</b>	<b>Objective</b>
Ring-necked duck	3700
Green-winged teal	9700
Resident Canada Geese	48000

## Comments<sup>1</sup>

- 1 Strong declines suspected, increase by >90%
- 2 halt/reverse declines with goal of restoring to 1972 levels
- 3 American Woodcock population estimate and objective was taken from the National Woodcock Conservation Plan, not a national shorebird plan.
- 4 US Shorebird Conservation Plan estimates *Calidris canutus roselaari* population @ 150,000; *C.c.rufa* @ 170,000; and *C.c.islandica* @ 80,000.  
3473 estimated annual migration through St. Lawrence River and Estuary.
- 5 restore to estimated 1980 levels.
- 6 Population change status unknown
- 7 uncertain recovery goal, population may have recovered somewhat since decline was calculated
- 8 Population change status unknown
- 9 Population change status unknown
- 10 Adopt Colorado Marshbird Workshop goals to increase populations and quality and quantity of breeding and wintering habitat to pre-1970s levels, prevent range contraction
- 11 ON to 4500 pairs, QB to 1050 pairs, NY to 2500 pairs, VT to 350 pairs
- 12 Less than 500 pairs estimated for Midwest region, including Ontario and the eastern Great Plains north of AR and OK. **\*\*GOAL:** Increase population to pre-1970s levels. Prevent range contraction, and increase quality and quantity of both breeding and wintering habitat to 1900 levels
- 13 Increase in QC to 500 pairs, NY to 300-500 pairs, Ontario to 3500 pairs
- 14 Adopt Colorado Marshbird Workshop objectives to increase populations and quality and quantity of breeding and wintering habitat to pre-1900s levels, and prevent range contraction
- 15 In areas where species may be declining, provide optimal nesting and foraging habitat by increasing wetland cover of emergent vegetation while retaining 30-60% of the wetland in open water or mudflat.
- 16 Adopt Colorado Marshbird Workshop objectives for this species to increase population, quality and quantity of breeding and wintering habitat to pre-1970s levels, and prevent range contraction
- 17 Adopt NAWMP habitat objectives to benefit this species, with the exception of moist soil
- 18 Estimate derived from relationship between Mid-winter Waterfowl Survey counts to population estimates derived from the Breeding Waterfowl Plot Survey of Eastern Canada; since this was published this relationship was found to be statistically invalid so the ACJV has chosen to use the wintering objective of 385,000 as an objective. **\*\*1990's estimate**  
Population goal for Canada is actually the goal for the Canadian portion of BCR 13.
- 19 1990's estimate
- 20 1990's estimate
- 21 1990's estimate; Population goal for Canada is actually the goal for the Canadian portion of BCR 13.
- 22 1990's estimate

## APPENDIX C

### Focus Area Information

**Table C1.** Focus areas for bird conservation in BCR 13, designated for landbirds (LB), shorebirds (SB), waterbirds (WB), or waterfowl (WF), or for individual species (AOU four-letter codes). IBA = “Y” denotes Important Bird Area. St/Prov = State/Province. Rows in bold represent Focus Areas named but not associated with a polygon on the map.

<b>Focus Area Name</b>	<b>IBA</b>	<b>St/Prv</b>	<b>Group</b>	<b>Species</b>	<b>Habitat</b>
Almonte Grasslands		ON	LB	SEOW	Grass&Shrub
Amherst Island	Y	ON	LB	LB, SB, WF	Grass
Ausable Riverine Forest		ON	LB	LOWA	Dec-Forest
<b>Baie Lavallière and île du Moine</b>		<b>QC</b>		<b>SEWR, SEOW</b>	<b>Marsh</b>
Beauce – Bellechasse		QC	LB	BOBO, NOHA	Grass
Beauharnois Dam and Canal		QC	WB		Wetland
Beauport	Y	QC	SB		
<b>Berry Island</b>		<b>ON</b>		<b>BOBO,GWWA</b>	<b>Grass&amp;Shrub</b>
Black River Valley		NY	LB	BOBO	Grass&Shrub
Bois-Francis		QC	LB	CAWA,NOGO,YBSA,NOFL	Mix-Forest
Braddock Bay	Y	NY	LB	WB, multi-species	Wetland, Forest
Breckenridge Area		QC	LB	RHWO, LOSH	Grass
Cap Tourmente		QC	SB	LB, raptors, SEWR	Forest, Grass
Cape Croker		ON	LB	BOBO	Grass&Shrub
Cape Rich (CFB)		ON	LB	BAEA,BOBO	Grass&Shrub
Carden Plain	Y	ON	LB,SB	UPSA,LOSH,RHWO,GRSP,HESP	Alvar
Cayuga Grasslands		ON		SEOW,wintr rptrs	Grass&Shrub
Chanty Island		ON	WB	GREG,BCNH	Marsh
<b>Clear Creek</b>		<b>ON</b>		<b>WOTH,RSHA,BTBW</b>	<b>Dec-Forest</b>
Conneaut Marsh- Geneva Marsh	Y	PA	WB	SB	Marsh
Contrecoeur	Y	QC	WF		Marsh
<b>Cowansville area</b>		<b>QC</b>		<b>GWWA</b>	<b>Shrub, Early</b>
Cussewago Bottoms	Y	PA	WF	WOTH	Forest,Wetland
Cuyahoga Valley	Y	OH	LB	CERW,WOTH	Dec-Forest
<b>Dead Creek WMA</b>	<b>Y</b>	<b>VT</b>		<b>SB</b>	
<b>Delta Park</b>	<b>Y</b>	<b>VT</b>		<b>SB</b>	
Dundas/Coot's Paradise		ON	LB	LOWA	Dec-Forest
Dundee Area		QC	LB	SEWR,GWWA,RHWO	Wetland,Forest,Shrub
<b>Dunnville/Cayuga Slough Forest</b>		<b>ON</b>		<b>SEOW</b>	<b>Marsh</b>
Eastern Lake Ontario beaches		NY	WB,SB	PIPL, CATE	Beach, Shore
<b>Eastern Manitoulin Bay</b>		<b>ON</b>		<b>YBSA,NOGO,BTBW</b>	<b>Mix-Forest</b>
Erie NWR	Y	PA	WB	SB, SEWR,BOBO,NOHA	Grass,Shrub,Marsh
Ferndale Flats		ON	LB	GWWA	Grass&Shrub
Finger Lakes		NY	WF,LB	HESP,SEWR,BOBO,NOHA	Grass&Shrub
<b>Fitzwilliam Island</b>		<b>ON</b>		<b>YBSA,NOGO,BTBW</b>	<b>Mix-Forest</b>
Fort Drum Grasslands	Y	NY	SB,LB	UPSA	Grass
Fort Edwards/Saratoga	Y	NY	LB	HESP,UPSA,BOBO,NOHA,GWWA	Grass&Shrub
Frontenac Axis		ON	LB	CERW,BTBW	Dec-Forest
Gameland 101 complex		PA	LB	AMWO	Dec-Forest, Shrub
Gameland 69 complex	Y	PA	LB	WOTH, AMWO	Dec-Forest, Shrub
Ganaraska/Oak Ridges		ON	LB	RSHA,BTBW, WF?	Dec-Forest

**Table C1 (Continued)** Brief list of focus areas for bird conservation in BCR 13.

<b>Focus Area Name</b>	<b>IBA</b>	<b>St/Prv</b>	<b>Group</b>	<b>Species</b>	<b>Habitat</b>
<b>Gatineau Park</b>		<b>QC</b>		<b>CERW,WOTH,GWWA,FISP</b>	<b>Forest, Shrub</b>
Geauga County Forests		OH	LB	CERW,WOTH	Dec-Forest
Gentilly		QC	SB,WF		
<b>Gordon Park Impoundment/Dyke14</b>	<b>Y</b>	<b>OH</b>		<b>SB</b>	<b>Wetland(?)</b>
<b>Gore Bay, Manitoulin</b>		<b>ON</b>		<b>BOBO,SEOW</b>	<b>Grass&amp;Shrub</b>
Grand River Forest		ON	LB	CERW,LOWA,RHWO	Dec-Forest
Hamilton Harbour, Toronto Harbour, Dundas Valley	Y	ON	WF,WB	BCNH, CATE	Wetland
Hawk Cliff, St. Thomas		ON	LB	Raptors	
<b>Hemmingford area</b>		<b>QC</b>		<b>FISP, RSHA</b>	<b>Forest, Grass</b>
Henslow's Agricultural Fields	Y	PA	LB	BOBO, HESP	Grass
Hochelefe Archipelego		ON	WB		Wetland
Holiday Beach		ON	WF,LB	Raptors	
Holland Marsh		ON	LB	SEWR,SEOW,NOHA	Marsh
Hudson River Marshes/Islands		NY	WF,WB		Marsh
Huntingdon area		QC	LB	GWWA,FISP,WPWI	Forest, Grass
Iroquois NWR/OakOrchard WMA	Y	NY	WF,WB, LB, SB	BOBOBO,HESP,SEWR,CERW, NOHA	Grass&Shrub
Isaac Lake		ON	WB		
Kettle Point		ON	LB	Raptors	
<b>Killbuck WMA</b>	<b>Y</b>	<b>OH</b>		<b>SB</b>	<b>Wetland</b>
<b>LaCloche</b>		<b>ON</b>		<b>LOSH,SEOW,GWWA</b>	<b>Alvar, Grass</b>
Lake Champlain Basin		NY/VT	WF,WB		Various
Lake Champlain Shoreline		VT/NY	LB,SB		
Lake Champlain Valley		NY/VT	LB	BOBO,NOHA	Grass&Shrub
Lake Ontario, Prince Edward County		ON	WF		Marsh
Lake Ontario South Shore Marshes		NY	WB		Marsh
Lake Scugog		ON	WF,WB, LB	SEWR,SEOW,NOHA	Marsh
Lake Simcoe		ON	WB		Wetland
Lake St. Clair, Rondeau, Point Pelee	Y	ON	SB	BLTE,FOTE	Wetland
Lake St. Luis/Lk St. Francis Islands		QC	WB	GRSC	Wetland
Lake St. Pierre	Y	QC	SB, WB	WF, Goldeneye spp. & scaup spp.	Fluvial Estuary
Lemon Fair River/ Cornwall Swamp		VT	LB	ABDU, WODU, COGO	Wetland
Leslie Street Spit	Y	ON	WB		
Letchworth State Park area	Y	NY	LB	CERW,WOTH,RSHA,GWWA	Dec-Forest
Lisbon Grasslands/Indian River	Y	NY	LB,WB	GWWA,WPWI,FISP,NOHA,SEWR	Grass&Shrub
Long Point Provincial Park and NWA	Y	ON	SB,WB	PIPL	Marsh
Long Point/Amherst/Wolfe Island	Y	ON	LB,WF	HESP,raptors,SEOW,SEWR,	Grass&Shrub
<b>Loraine Impoundment</b>	<b>Y</b>	<b>OH</b>	<b>SB</b>		<b>Wetland</b>
Lower Detroit River, Pelee Islands	Y	ON	WF		Wetland
Lower St. Lawrence Estuary		QC	WB		Wetland
Lower St. Lawrence River & Islands	Y	NY	WB	BAEA	Island
Luther Marsh	Y	ON	WF,WB	LB,NOGO,SEOW,GREG,BCNH	Grass&Shrub
McGregor Point		ON	LB	NOGO,BTBW	Mix-Forest
Meadville/Erie NWR		PA	LB	SEOW,BOBO,NOHA	
<b>Mentor Marsh</b>	<b>Y</b>	<b>OH</b>		<b>PIPA</b>	<b>Marsh,Beach</b>
Minnising Swamp		ON	LB,WF	RHWO	Marsh
<b>Misery Bay</b>		<b>ON</b>		<b>LOSH,GWWA</b>	<b>Alvar, Grass</b>

**Table C1 (Continued)** Brief list of focus areas for bird conservation in BCR 13.

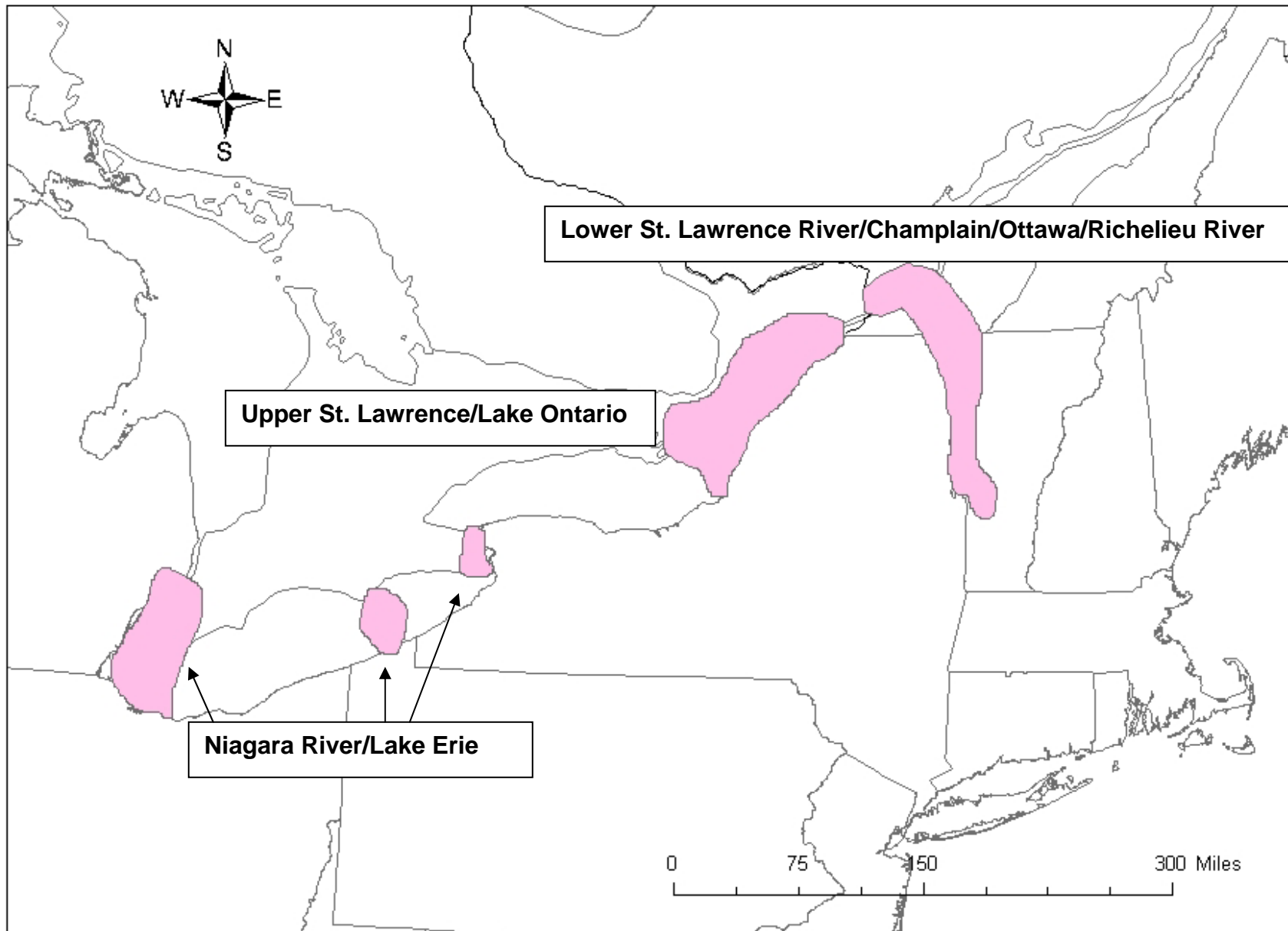
<b>Focus Area Name</b>	<b>IBA</b>	<b>St/Prv</b>	<b>Group</b>	<b>Species</b>	<b>Habitat</b>
<b>Missisquoi NWR</b>	<b>Yes</b>	<b>VT</b>	<b>SB</b>		
Mohawk River Valley		NY	LB	BOBO,UPSA,HESP,GWWA	Grass&Shrub
Mont Royal		QC	LB		
Monteregian Hills		QC		CERW,WOTH,RSHA	Dec-Forest
Montezuma Wetlands Complex	Yes	NY	All	CERW,RSHA,WOTH	Wetland, Forest
Montmagny	Yes	QC	SB	SESA, HERG	
<b>Mosquito Creek</b>	<b>Yes</b>	<b>OH</b>		<b>SB</b>	
Napanee Limestone Plain	Yes	ON	LB,SB	LOSH	Grass&Shrub
Nation's Road, Candice/Hemlock Lakes	Yes	NY	LB	HESP,BOBO,UPSA,RSHA,CE RW,RHWO,NOGO	Grass&Shrub
Niagara Escarpment		ON	LB	WOTH,RSHA,BTBW	Dec-Forest
Niagra River Corridor	Yes	ON	WF,WB,LB	BOGU,HERG	Wetland
Niagra River Corridor	Yes	NY	WB,LB,SB		Various
Norfolk Sandplain	Yes	ON	LB	WOTH,RSHA,CERW,HOWA	Dec-Forest
Nottawasawa Island	Yes	ON	WB		
Oneida Lake	Yes	NY	WF,WB	COTE	Island
Ottawa River Valley		QC	WF,WB,LB	SEWR	Various
<b>Otter Creek</b>		<b>VT</b>	<b>LB</b>	<b>SEWR,NOHA</b>	<b>Wetlands</b>
Pelee Islands	Yes	ON	WB	BCNH,DCCO	Wetlands
Penetanguishene Peninsula		ON		CERW	Dec-Forest
Perch River Grasslands	Yes	NY	SB,WB,LB	UPSA ,BLTE	Grass
<b>Philipsburg Migratory Bird Sanctuary</b>		<b>QC</b>		<b>CERW,WOTH,RSHA</b>	<b>Dec-Forest</b>
Pigeon lake		ON	WB	CATE,RBGU	Wetland
Pinery		ON		RHWO,LOWA	Dec-Forest
Point Clark		ON		LB	
Point Pelee NP & Hillman Marsh	Yes	ON	LB,SB,WF		Wetland, forest
Point Abino	Yes	ON	LB		Dec-Forest
Portneuf		QC	SB	LESA,WRSA	Shoreline
Port Franks, Thedford Flats	Yes	ON	WF,LB		Marsh, Forest
Presqu'île Provincial Park	Yes	ON	WB,SB,LB	SEWR	Various
Presque Isle State Park	Yes	PA	LB,SB,WB	PIPL	Dec-Forest, Water
Prince Edward County, Presquile Lake & Park		ON	WB		Marsh
Prince Edward Point NWA	Yes	ON	LB,SB		Various
Pymatuning / Heartstown	Yes	PA	WB,LB,SB	BLTE,AMBI,KIRA,PBGR,	Grass
<b>Quarry Bay/Belanger Bay</b>		<b>ON</b>	<b>LB</b>	<b>LOSH,GWWA</b>	<b>Alvar Grass</b>
<b>Réserve écologique du Pin rigide</b>		<b>QC</b>	<b>LB</b>	<b>FISP,WPWI</b>	<b>Shrub, Early</b>
<b>Richelieu River</b>		<b>QC</b>	<b>LB,WF</b>		<b>Wetland</b>
Richmond Fen		ON	LB	SEWR.SEOW,NOHA	Marsh
Rigaud area		QC	LB		Forest, Grass
Roderick Preserve	Yes	PA	LB,SB	AMWO	Shrub, Early
Rondeau Bay		ON	WF,WB,LB	RHWO,LOWA	Dec-Forest
South Shore St. Lawrence River (Montreal – Dundee)		QC	LB		Dec-Forest
Salmon Creek	Yes	NY	LB	CERW,WOTH	Dec-Forest
<b>Sandbar WMA</b>	<b>Yes</b>	<b>VT</b>	<b>SB</b>		<b>Wetland</b>
Schodack Island in Hudson River	Yes	NY	LB	CERW,WOTH,WB	Dec-Forest

Shenango	Yes	PA	SB,WB,WF		Wetland
Six Nations		ON		WOTH,RSHA	Dec-Forest

**Table C1 (Continued)** Brief list of focus areas for bird conservation in BCR 13.

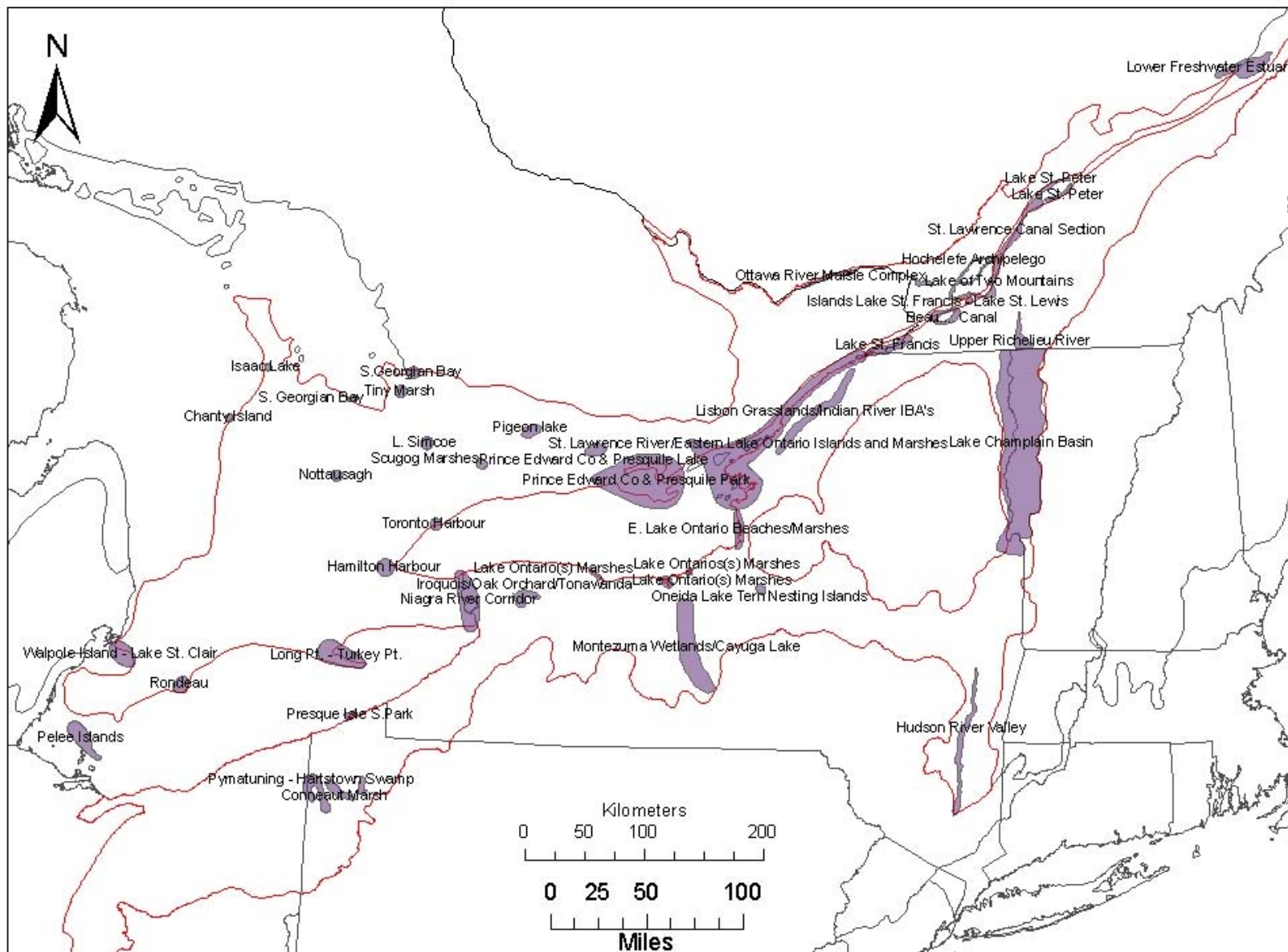
<b>Focus Area Name</b>	<b>IBA</b>	<b>St/Pr</b>	<b>Group</b>	<b>Species</b>	<b>Habitat</b>
Skunk's Misery/Bothwell Sandplain	Y	ON	LB	WOTH,RSHA,BTBW	Dec-Forest
Smith Falls Limestone Plain		ON		LOSHUPSA	Grass&Shrub
South Georgian Bay (Matchedash Bay)	Y	ON	WF,WB		Wetland
South Shore of Oneida Lake		NY	LB	CERW,WOTH	Dec-Forest
Southeastern Lake Ontario Shoreline	Y	NY	LB		Forest
Southern St. Lawrence Plain		NY		LB	Grass&Shrub
St. Clair Lake and Marsh Complex	Y	ON		SB	Marsh, Grass
St. John Shorthills		ON		LOWA, WOTH	Dec-Forest
St. Lawrence River / Eastern Lake Ontario		NY		WB	Beach& marsh
St. Lawrence River Islands (Montréal - Sorel)		QC	LB	BOBO,SEOW,SEWR	Grass, Wetland
St. Lawrence Valley Wetlands		NY		WB	Wetland, Grass
SW Lake Ontario (?)		ON		LB	
Tiny Marsh	Y	ON	WF		Wetland
Upper Bruce Peninsula	Y	ON	LB,WF(?)	NOGO,BTBW	Mix-Forest
Upper Richelieu River		QC	WB		
<b>Upper St. Lawrence Islands</b>		<b>ON</b>		<b>SEWR,SEOW,NOHA</b>	<b>Marsh</b>
Vidal Bay		ON		YBSA,NOGO,BTBW	Mix-Forest
<b>Volant Grasslands area</b>	<b>Y</b>	<b>PA</b>		<b>BOBO, HESP, SEOW</b>	<b>Grass</b>
Walpole Island		ON	WF,WB,LB	SEWR,SEOW,NOHA	Grass&Shrub
<b>West end of Lake Ontario</b>	<b>Y</b>	<b>ON</b>		<b>SB</b>	
Whiskey Hollow	Y	NY		CERW,WOTH,GWWA	Dec-Forest
Wolfe Island	Y	ON	LB	HESP,SEOW,raptors	Grassland
Wye Marsh	Y	ON	WF		Marsh

**Figure C1.** Priority Regions in BCR 13

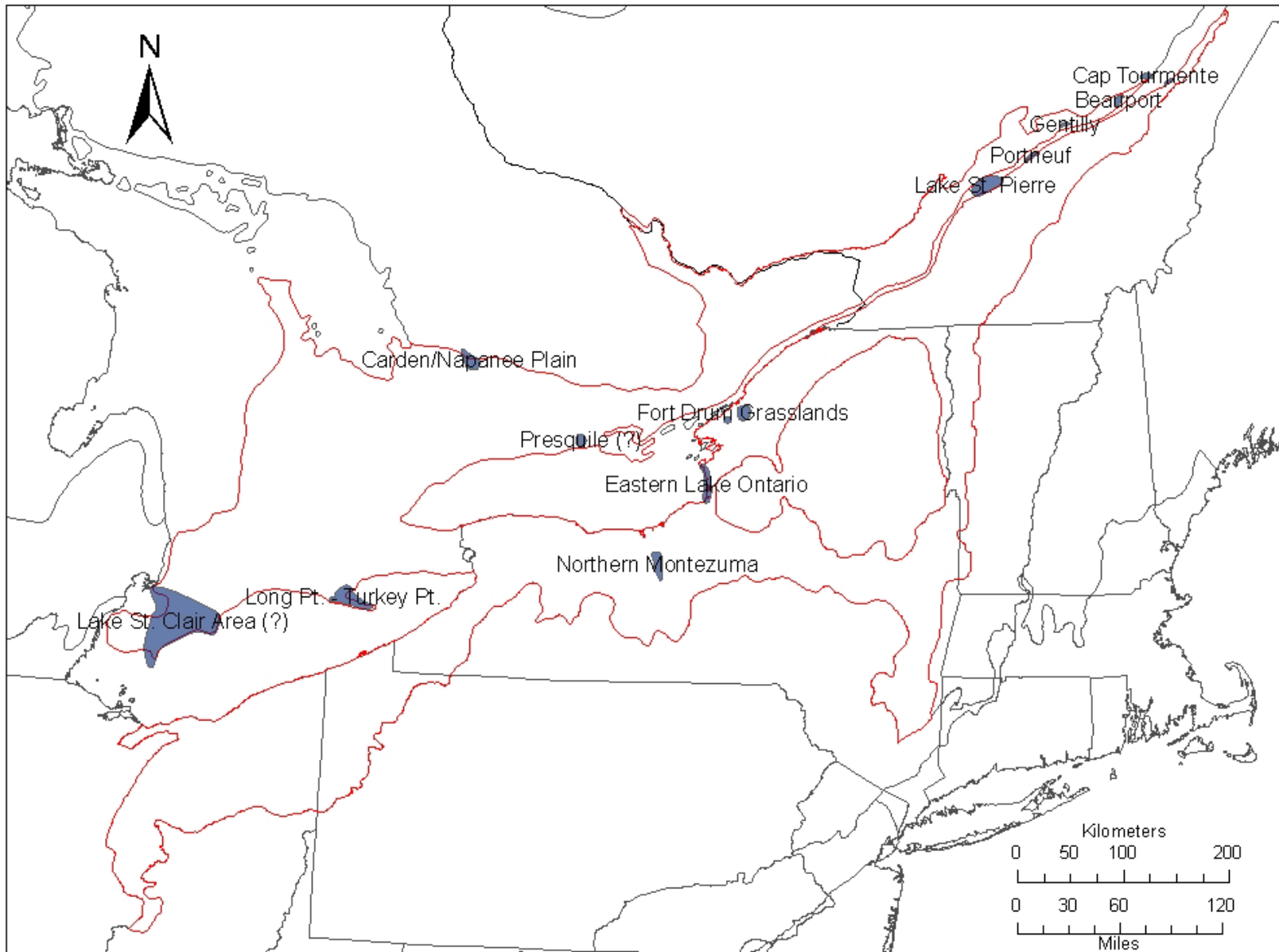




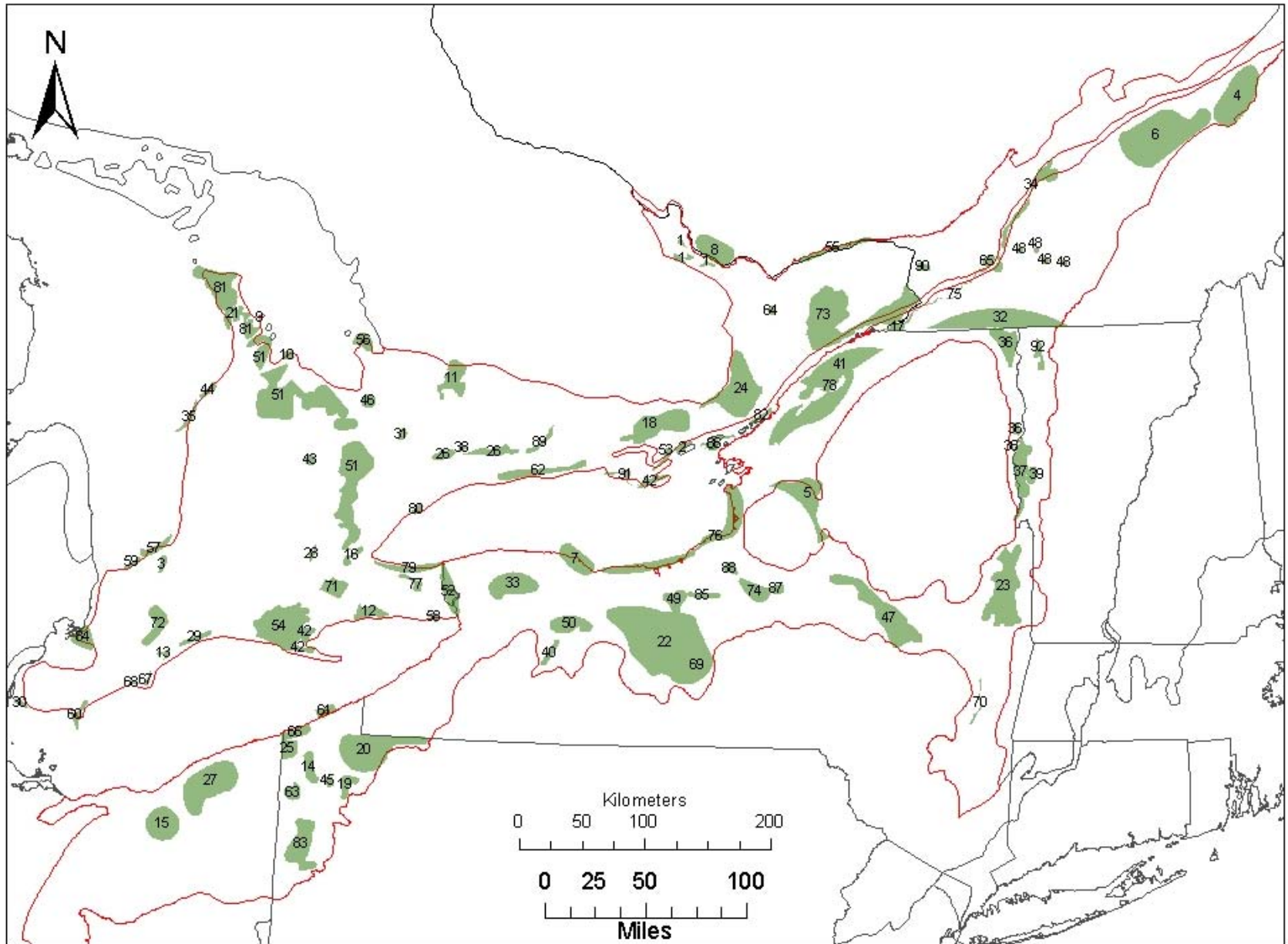
**Figure C2. Waterbird Focus Areas in BCR 13**



**Figure C3.** Shorebird Focus Areas in BCR 13



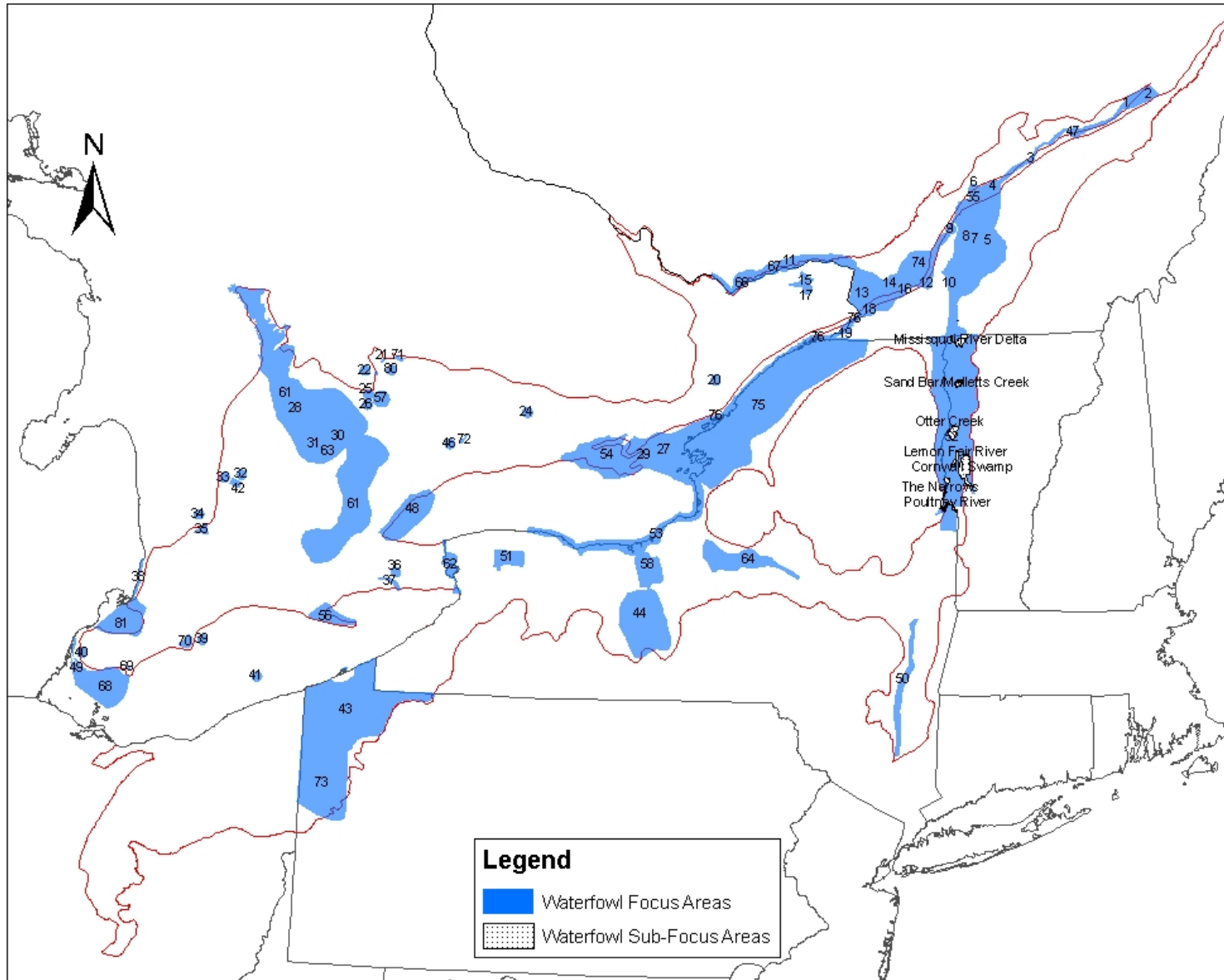
**Figure C4.** Landbird Focus Areas in BCR 13. See following page for legend identifying numbered focus areas.



**Legend of numbered focus areas from Figure C4 (Above)**

<u>Focus Area</u>	<u>ID</u>	<u>Focus Area</u>	<u>ID</u>	<u>Focus Area</u>	<u>ID</u>
Almont Grasslands	1	Iroquois/Oak Orchard/Tonawanda	33	Pymatuning Grasslands	63
Amherst Island	2	Islands on St. Lawrence		Richmond Fen	64
Ausable Riverine Forest	3	(Montreal/Sorel)	34	Rigaud area	65
Beauce-Bellechasse	4	Kettle Point	35	Roderick	66
Black River Valley	5	Lake Champlain Grasslands	36	Rondeau	67
Bois-Francis	6	Lake Champlain Shoreline	37	Rondeau Bay / Erieau	68
Braddock Bay	7	Lake Scugog	38	Salmon Creek	69
Breckenridge area	8	Lemon Fair River/ Cornwall Swamp	39	Schodack Island SP/Stockport Flats	
Cape Croker	9	Letchworth State Park	40	area	70
Cape Rich (CFB)	10	Lisbon Grslns, St. Lawrence Plains	41	Six Nations	71
Carden Plain / Napanee Plain	11	Long Point	42	Skunks Misery / Bothwell Sandplain	72
Cayuga / Dunnville	12	Luther Marsh	43	Smith Falls Limestone Plain	73
Clear Creek	13	McGregor Point	44	South Shore Oneida Lake	74
Cusswego Bottoms	14	Meadville/Erie NWR	45	South Shore St. Lawrence River	75
Cuyahoga Valley	15	Minnising Swamp	46	Southeastern Lake Ontario Shoreline	76
Dundas / Coots Paradise	16	Mohawk River Valley	47	St. John's Shorthills	77
Dundee Area	17	Mont Royal	48	St. Lawrence Plain, forest patch	78
Dunnville	18	Montezuma Wetland Complex	49	SW Shore Lake Ontario	79
Erie NWR/Gameland 69 Complex	19	Nation's Road & Candice/Hemlock		Toronto Harbour	80
Erie NWR/Henslows Agricultural Fields	20	Lakes	50	Upper Bruce Peninsula	81
Ferndale Flats	21	Niagra Escarpment Hardwood	51	Upper St. Lawrence Islands	82
Finger Lakes	22	Niagra River Corridor	52	Volant Grasslands	83
Fort Edwards/Saratoga	23	Norfolk Area	53	Walpole Island	84
Frontenac Axis	24	Norfolk Sand Plain	54	Whiskey Hollow	85
Gameland 101 Complex	25	Ottawa River Maisle complex	55	Wolfe Island	86
Ganaraska / Oak Ridges	26	Penetanguishene Peninsula	56	<i>Unnamed</i>	87
Geauga County Forests	27	Pinery	57	<i>Unnamed</i>	88
Grand River Forest	28	Point Abino	58	<i>Unnamed</i>	89
Hawk Cliff , St. Thomas	29	Point Clark	59	<i>Unnamed</i>	90
Holiday Beach	30	Point Pelee	60	Prince Edward Point	91
Holland Marsh	31	Presque Isle	61	<i>Unnamed</i>	92
Huntingdon-Cowansville Areas	32	Presquile	62		

**Figure C5.** Waterfowl Focus Areas in BCR 13. See following page for legend identifying numbered focus areas.

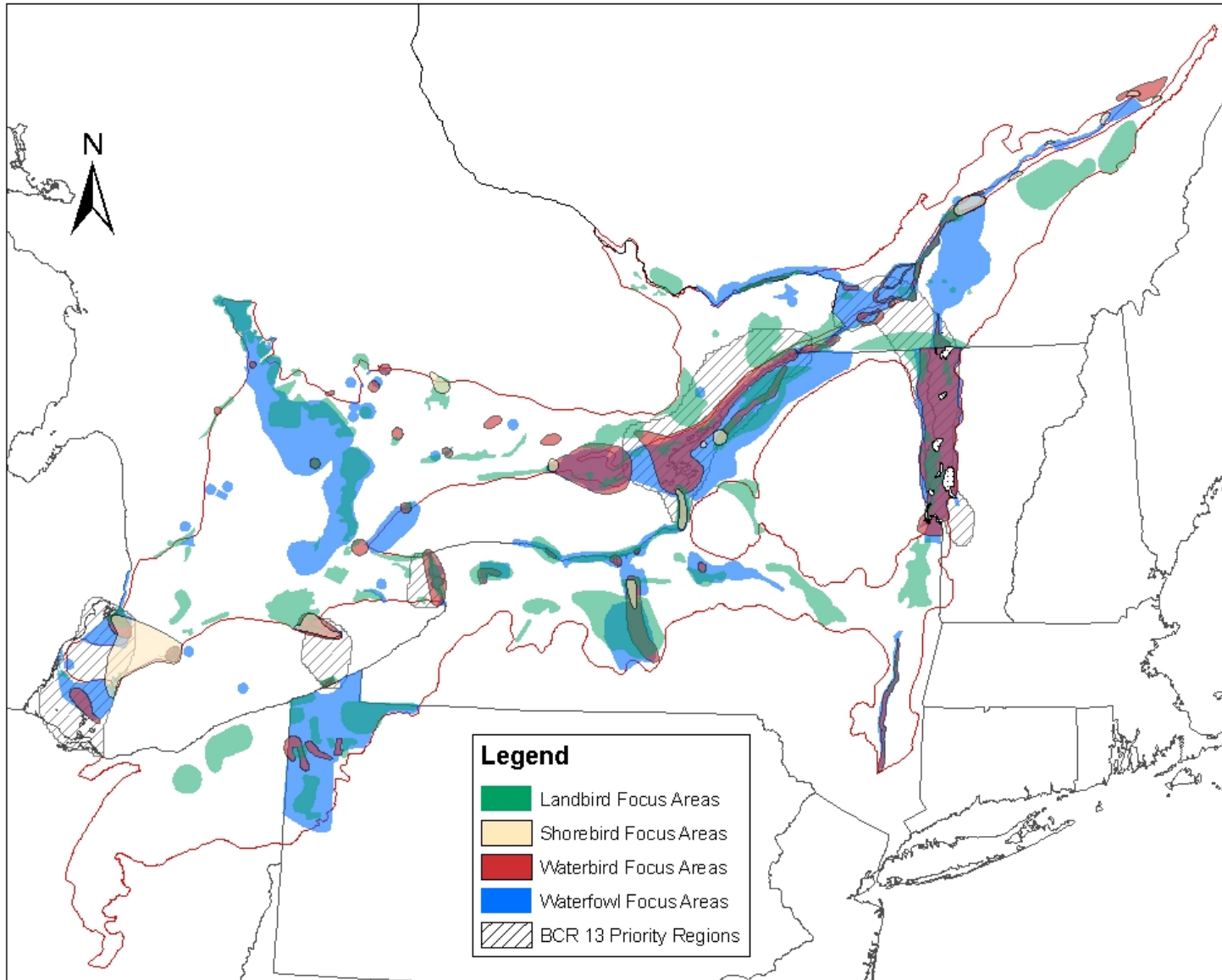


**Legend of numbered focus areas from Figure C5 (Above)**

<b><u>Focus Area</u></b>	<b><u>ID</u></b>
Unnamed	1-8
Contrecoeur	9
Unnamed	10-15
Lac Saint-Louis	16
Unnamed	17-20
Wye Marsh	21
Unnamed	22
Tiny Marsh	23
Unnamed	24-34
Port Franks, Thedford Flats	35
Unnamed	36-42
Cussewago Bottoms, Pymatuning Reservoir area	43
Finger Lakes	44
Ganaraska/Oak Ridges	46
Gentilly (?)	47
Hamilton and Toronto Harbour areas (?)	48
Holiday Beach	49
Hudson River Valley	50
Iroquois/Oak Orchard/Tonawanda	51
Lake Champlain Basin	52
Lake Ontario Beaches and Marshes	53
Lake Ontario Islands, Prince Edward Co	54
Lake St. Peter (Pierre) and St. Lawrence Canal	55

<b><u>Focus Area</u></b>	<b><u>ID</u></b>
Long Pt., - Turkey Pt. (?)	56
Minnising Swamp	57
Montezuma Wetlands	58
Niagra Escarpment Hardwood/Grand River Forest	61
Niagra Escarpment Hardwood/Upper Bruce Peninsula	61
Niagra River Corridor	62
Luther Marsh	63
Oneida Lake	64
Ottawa River Corridor	66
Ottawa River Complex (?)	67
Lower Detroit River, Pelee Islands	68
Point Pelee	69
Rondeau	70
S. Georgian Bay (or Matchedash Bay?)	71
Lake Scugog	72
Shendango River, Volant Grasslands area (?)	73
St. Lawrence and Ottawa River Corridor	74
St. Lawrence Plain	75
St. Lawrence River	76
St. Lawrence River	76
St. Lawrence River	76
Unnamed	80
Walpole Island, E. Lake St. Clair	81

**Figure C6.** All-bird Focus Areas for BCR 13 (combination of map layers in Figures C1-C5)



## APPENDIX D

### GLOSSARY OF TERMS & ACRONYMS

#### **ACJV**

Atlantic Coast Joint Venture; a partnership of agencies, organizations, industry, and individuals interested in efficiently coordinated . Most of the bird habitat joint ventures were historically focused on waterfowl conservation, but expanded their vision to encompass all native bird species and habitats after several other major bird initiatives arose, encompassing all taxonomic groups. For more information see [www.acjv.org](http://www.acjv.org)

#### **Alvar**

A type of ecological community characterized by “grassland, savanna and sparsely vegetated rock barrens that develop on flat limestone or dolostone bedrock where soils are very shallow. Almost all of North America’s alvars occur within the Great Lakes basin, primarily in an arc from northern Lake Michigan across northern Lake Huron and along the southern edge of the Canadian Shield to include eastern Ontario and northwestern New York state. Most types of alvar communities are globally imperiled, and they support several globally rare species as well.”(Source: <http://www.epa.gov/ecopage/shore/alvars/>)

#### **BCR**

Bird Conservation Region; a system of ecoregions, areas with similar habitat types and bird communities, derived for regional bird conservation planning. For more information see:

<http://www.bsc-eoc.org/international/bcrmain.html>

See North American map of BCRs at <http://www.nabci-us.org/map.html>

#### **Carolinian Forest**

A forest type characterized by species such as ash, chestnut, hickory, oak, walnut, and tulip tree. This forest type is most typical of the southern United States, but it reaches its northern limit in Southwest Ontario, where it hosts the richest plant and animal communities in all of Canada. Carolinian forests in Ontario are under intense development pressure due to very high human density, and more than 80% of Carolinian forests in Canada have already been converted to other land uses.

#### **CWS**

Canadian Wildlife Service

#### **EHJV**

Eastern Habitat Joint Venture

#### **GIS**

Geographic Information System. Map layers and associated databases with organized, spatially-explicit information (e.g., attributes of map features), used with computer software (e.g., ARC-INFO).

#### **Hemi-marsh**

Emergent wetland conditions whereby open water covers roughly half the wetland area and half the area is emergent vegetation, in an interspersed pattern. These conditions generally maximize both the abundance and richness of waterfowl and waterbirds.

#### **Lacustrine**



Wetlands adjacent to large standing waterbodies (e.g., lakes or reservoirs). Hydrology (e.g., groundwater discharge and interflow) of the adjacent uplands, wetlands, and lake are interconnected, with gradient dependent on relative conditions (e.g., wet or dry periods). The water elevation of the lake maintains the water table in the wetland.

### **NABCI**

North American Bird Conservation Initiative; a multinational effort to integrate and coordinate bird conservation planning across all major taxonomic and national initiatives. For more information see: <http://www.nabci-us.org/>

### **Palustrine**

Freshwater wetlands including those dominated by trees, shrubs, emergent vegetation, mosses or lichens, and unvegetated wetlands that are small (<8 ha / 20 ac) and shallow (<2 m / 6 ft deep during low water). Typical palustrine vegetated wetlands include marshes, swamps, bogs, fens, wet prairies, and small, shallow, permanent or intermittent water bodies commonly called ponds or potholes.

### **SLV**

Saint Lawrence (River) Valley, the broad plain adjacent to the Saint Lawrence River as it flows from Lake Ontario through the Province of Ontario, New York State, and Quebec, to Montreal.

### **Sympatric**

Two species sharing the same area at the same time are sympatric. Commonly refers to theories of competition and/or evolution. Contrasts with the term “allopatric” which means geographically separate.



## APPENDIX E

### PARTNER CONTACT INFORMATION

If you are willing to be listed in a Directory of partners for BCR 13 please send an email to [mitch\\_hartley@fws.gov](mailto:mitch_hartley@fws.gov) with your contact information. The info below shows the Directory format but does not yet include most bird conservation partners in the region.

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