

DRAFT: Blueprint for the Design and Delivery of Bird Conservation in the Atlantic Northern Forest

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Introductory Note

This document is a compilation of myriad information on birds, their habitats, and conservation in the Atlantic Northern Forest Bird Conservation Region. It reflects the wealth of knowledge and expertise contributed by the many partners participating in this bird conservation initiative. Appropriate recognition of all contributions to this effort may not be possible, but nonetheless we apologize for leaving anyone out.

The document is labeled *draft*, although it is close to the final form for its first version. It is intended to be a “living” document that will be updated and improved over time. The hope is for it to be a tool that will be useful for all the partners in their effort to conserve the native birds of the Atlantic Northern Forest. The final reviews of this version of the document provide opportunities to correct remaining errors, fill in missing information, and revise sections of this document that aren’t quite right. Sections that are still particularly in need of review include the focus area delineations and descriptions, Section 4.2 in the main body of the document, and the population objectives. Please also keep an eye open for errors, incomplete or inappropriate information, and additions that would strengthen its usefulness.

The document is organized as a fairly short main body (about 30 pages), followed by extensive appendices with supporting information. The main text provides background on the BCR and existing bird conservation initiatives and then presents a framework for the design and delivery of bird conservation in the BCR. The appendices present detailed information on priority birds, their habitats, and recommendations on where to focus bird conservation efforts both in terms of actions and geographic locations. The document is set up with hyperlinks between the table of contents and main sections in the text and appendices, as well as links between the main body and associated appendices, between associated information within appendices, and to internet or e-mail addresses, with the intent of making it easier to locate the information referred to in the main text of the document. **Please be sure to activate the “Web” toolbar in MS Word to have full ability for moving back and forth within this document.** Please send all comments on this draft document to [Randy Dettmers](#).

Acknowledgements

The many participants in the BCR 14 workshop held in Maine during December of 2002 provided much of the raw material that went into this document, and all the partner organizations are warmly thanked for allowing their personnel to work on this effort. Special thanks are due to Andrew Milliken, Reg Melanson, and Joe McCauley for fostering this BCR effort through its infancy and bringing the many partners together. David Pashley and the American Bird Conservancy have also been strong supporters from the very beginning. Tom Hodgman was instrumental in organizing and hosting the workshop in Maine and has been an invaluable source of information for the BCR effort. The BCR 14 Steering Committee members have responded very cooperatively to requests for follow-up information after the Maine workshop and their efforts are greatly appreciated. And very special thanks goes to Linda Welch for compiling all the information that went into the appendix with the detailed summary of conservation objectives and recommendations for priority species and habitats as compiled from existing bird conservation plans – thanks for letting us “steal” your work for the good of the BCR!

Executive Summary

The Atlantic Northern Forest Bird Conservation Region (BCR) encompasses a wealth of forest, coastal marine, and inland freshwater wetland resources that support an incredible diversity and abundance of birds. For three days in early December 2002, seventy biologists representing two countries, four provinces, five states, numerous non-government organizations, and private industry met in Rockland, Maine, to begin a process for international delivery of all-bird conservation within this region. Over the course of this workshop the participants identified 101 priority species, 132 focus areas, and 49 projects for bird conservation action. These products, in conjunction with existing plans from the major bird conservation initiatives, form the backbone of a strong biological foundation which will inform on-the-ground actions for achieving bird conservation goals within this BCR. This document presents a strategic design of the key components that will need to be implemented in order to maintain healthy populations of birds native to the Atlantic Northern Forest BCR. A brief summary of this BCR Blueprint for bird conservation includes:

- A relatively brief main body of text (about 20 pages) provides the conceptual basis for the design and implementation of bird conservation in this BCR. Extensive appendices provide detailed information on priority species, habitats, recommendations on management and research actions, habitat focus areas, and priority implementation projects. Hyperlinks allow readers to follow links back and forth between and among the main body of the document and the appendices. Highlights of this document include:
- 17 species are identified as the highest priority birds in this BCR, which supports a large proportion of their population; there also are high continental and regional concerns for these species. They include American Black Duck, American Woodcock, Barrow's Goldeneye, Bay-breasted Warbler, Bicknell's Thrush, Canada Warbler, Common Eider, Great Cormorant, Greater Shearwater, Eastern Harlequin Duck, Ipswich Savannah Sparrow, Nelson's Sharp-tailed Sparrow, Piping Plover, Purple Sandpiper, Red-necked Phalarope, Semipalmated Sandpiper, and Wood Thrush.
- Partners have identified 48 shorebird, 29 waterfowl, and 20 waterbird focus areas, many of which overlap and the majority of which represent coastal and estuarine habitats. Common areas of importance to all these birds include coastal Maine, Bay of Fundy coast, southeastern coast of Nova Scotia, Gulf of St. Lawrence coast, Northumberland Strait, mouth of the St. Lawrence River, and St. John River floodplain. Numerous inland freshwater areas are also recognized as important.
- Given the dynamic nature of the extensive managed forests of this BCR, a need was recognized for alternative approaches to traditional focus areas for forest bird conservation. A subcommittee was tasked with developing models and GIS tools that land managers can use to design landscapes supporting the full spectrum of disturbance-dependent and mature forest birds. 42 habitat focus areas are identified for landbirds associated with grasslands, high elevation conifer forests, and saltmarshes.

- 18 priority conservation projects that target easements, acquisition, or management agreements for improved protection of critical habitats are identified, including sites in Downeast Maine, St. Lawrence estuary, Gaspé Peninsula, Magdalen Islands, upper Bay of Fundy, the Connecticut River valley, and mountaintop/regenerating conifer forest in Maine and Atlantic Canada. 21 priority research/monitoring projects are described to help fill critical information gaps on priority species. 10 priority outreach projects to better inform managers and the public about conservation threats and appropriate management techniques are described.
- A summary of issues, objectives, and recommended implementation strategies (management, research, and monitoring activities) from existing plans of the major bird conservation initiatives is presented. The summary is organized by habitat types, including information on focal species from all bird groups that are associated with a given habitat type.

The products from the BCR workshop and information from existing bird plans have been compiled into a summary of current data and recommendations for implementing all bird conservation across the region. This BCR “blueprint” describes bird conservation issues for the region, the priority species, focus areas for habitat conservation, priority projects for scientific investigation and conservation action, and ties this information to goals of the major bird conservation initiatives. This plan will help partners in this BCR effort to focus on the critical actions needed to fulfill the vision of restoring and sustaining populations and habitats of native birds of this region.

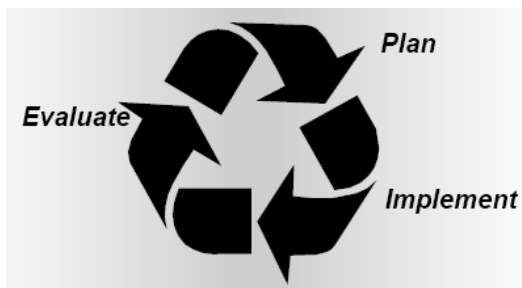
Bird Conservation in the Atlantic Northern Forest

1. Introduction

From Bicknell's Thrushes on mountain peaks, to the large populations of American Black Duck, American Woodcock, and Black-throated Blue Warblers breeding throughout the expanses of northern forests and freshwater wetlands, to the millions of shorebirds, waterbirds, and waterfowl using the thousands of miles of coastline in the Canadian Maritimes and Maine, the Atlantic Northern Forest Bird Conservation Region (BCR) encompasses a wealth of forest and wetland resources that support an incredible diversity and abundance of birds. The Atlantic Northern Forest BCR effort was initiated in response to a recognition by bird conservation leaders in the northeastern U.S. and eastern Canada that significant threats to native bird populations exist across habitat types, taxonomic groups, and jurisdictional borders within this BCR, and that working cooperatively through a regional partnership would be an effective and efficient way to work toward minimizing these threats so that bird populations could be maintained or restored.

Bird Conservation Regions are ecologically-based units, as defined by the North American Bird Conservation Initiative (NABCI), for planning, implementing, and evaluating cooperative bird conservation efforts across North America. The aim of NABCI is to ensure that populations and habitats of North America's birds are protected, restored and enhanced through coordinated efforts at international, national, regional, and local levels guided by sound science and effective management. It is designed to increase the effectiveness of existing and new bird conservation initiatives through enhancing coordination, building on existing regional partnerships, and fostering greater cooperation among the nations and the people of the continent (from the [US-NABCI website](#)).

This document presents a strategic design of the key components that this BCR initiative will need to implement in order to maintain healthy populations of birds native to the Atlantic Northern Forest BCR. It establishes a series of goals, which will help move the BCR partnership toward realizing its vision of sustained bird populations in the region; it presents the biological foundation upon which recommendations for conservation actions are based; and it lays out a framework for implementing the recommended actions and for evaluating whether or not those actions are helping to meet the objectives of the BCR initiative. The document reflects the familiar conceptual framework in which conservation design and delivery are visualized as a



repeating cycle and incorporate the concepts of adaptive management. The cycle begins with biological planning based on sound science, followed by implementation, followed by evaluation to assess the effectiveness of the actions taken, and so on (Fig. 1). This bird conservation initiative should be a dynamic effort that incorporates new and up-to-date information into its planning and implementation processes at regular intervals.

Figure 1. Conceptual framework for conservation design and delivery.

1.1. Major Landforms, Habitat Types, and Characteristic Birds

The Atlantic Northern Forest BCR (BCR 14) encompasses a geographic area stretching southwest to northeast from the Taconic Hills of eastern New York/western Massachusetts and the Adirondack Mountains (cut off from the remainder of the BCR by the Lake Champlain valley), through most of Vermont, New Hampshire and Maine, Quebec south of the St. Lawrence River including the Gaspé Peninsula, and all of the Maritime provinces of New Brunswick, Prince Edward Island, and Nova Scotia (Fig. 2). Landforms within the Atlantic Northern Forest BCR range from low coastal plains (including offshore islands) in Maine and the Maritime provinces to high Appalachian peaks (4,000-6,000 ft. [1,220-1830 m]) in the White Mountains, Green Mountains, and Adirondacks. The northeastern terminus of the Appalachian Mountains is in northern New Brunswick, with only a few peaks reaching 2,500 ft. (750 m) in that area. Most of the Atlantic Northern Forest BCR, however, is low-mountainous or open hilly country, interspersed with valleys and plains. Highlands within this area constitute the headwaters of nearly every major river in the Maritime provinces and the New England states, including the Connecticut, St. John, and much of the St. Lawrence drainages. Highlands also contain numerous lake and pond systems with associated forested wetland habitats. The BCR collectively contains over 3 million acres (1.2 million ha) of open freshwater habitat. The region also contains some relatively large areas of farmland in the Connecticut, Androscoggin, Kennebec, Penobscot, St. John, and Miramichi River valleys, as well as on Prince Edward Island.

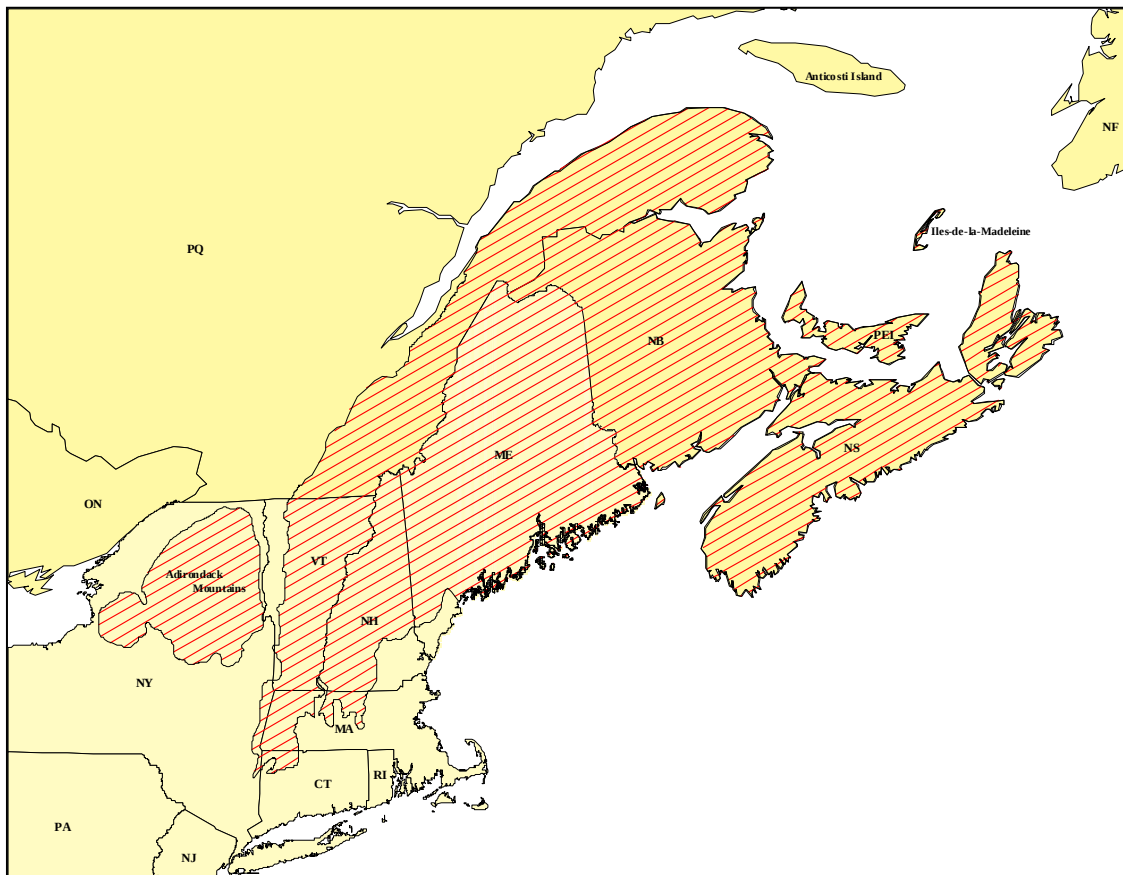


Figure 2. Atlantic Northern Forest Bird Conservation Region (BCR 14). Cross hatched area indicates geographic boundaries of the region.

The major habitat types of this BCR reflect the combination of mountainous, lowland plain, and coastal landforms encompassed within this geographic area. As suggested from the BCR's name, northern temperate forest habitat types dominate a large portion of this region. The most predominant general forest types include spruce-fir conifer, northern hardwood, and mixed deciduous-coniferous forests. Spruce-fir forests are typical of mountaintops and higher elevations in the Adirondack Mountains, Green Mountains, White Mountains, and the Gaspé Peninsula, as well as the interior portions of Maine and New Brunswick including lowland areas with poor soils or with boggy or swampy conditions. Maritime spruce-fir communities also occur in eastern Maine, Nova Scotia, and northern New Brunswick. Characteristic bird species associated with the more extreme mountaintop conditions (including stunted tree growth) include Bicknell's Thrush, Swainson's Thrush, Blackpoll Warbler, and Yellow-rumped Warbler. In other areas of spruce-fir dominated forests, characteristic species include Boreal Chickadee, Bay-breasted Warbler, Cape May Warbler, Blackburnian Warbler, Purple Finch, Red Crossbill, Spruce Grouse, and Pine Grosbeak. The Northern Hardwood forest type, dominated by beech, birch, and maple species, is a common forest type of the lower to middle elevations throughout this BCR, typical of areas with richer soil types. Characteristic bird species include Ruffed Grouse, Yellow-bellied Sapsucker, Wood Thrush, Veery, Black-throated Blue Warbler, American Redstart, Ovenbird, Blue-headed Vireo, and Rose-breasted Grosbeak. Deciduous forest types dominated by oaks are not very common in this BCR, but they do occur in the lower elevations of southern and western portions of the region, including the Adirondack and Green Mountains, and the Taconic and Berkshire Hills. These forests are dominated by red and white oak with hickory or ash as a co-dominant. Mixed deciduous-coniferous forest types are also common in the low to middle elevations of this region, including mixtures of northern hardwoods or oaks with hemlock and white pine in the southern portions of this region, and northern hardwoods with spruce-fir in the northern areas. While these mixed forest types support birds characteristic of both deciduous and coniferous forests, some species seem to be particularly well-suited to the mixed types, including Canada Warbler, Blackburnian Warbler, and Black-throated Green Warbler.

Early successional/shrubland habitat is another major type in the Atlantic Northern Forest, including early successional stages of all the forest types discussed in the previous paragraph, plus naturally-maintained shrubland habitats, such as those associated with rocky high-elevation areas, sandy flood plains of larger rivers, sandy coastal plains, or shrub swamps (including beaver flowages) and bogs. Birds characteristic of early successional forest conditions include American Woodcock, Ruffed Grouse, Chestnut-sided Warbler, Tennessee Warbler, Mourning Warbler, and Whip-poor-will. Birds associated with shrubby swamps and bogs or other disturbances such as openings created by fire include Palm Warbler, Olive-sided Flycatcher, Yellow-bellied Flycatcher, Nashville Warbler, Black-backed Woodpecker, and Rusty Blackbird.

In addition to the extensive upland forest and early successional habitats, this BCR also encompasses considerable amounts of wetland habitats, including extensive coastline in the Maritime provinces, the St. Lawrence Estuary, and Maine (e.g., emergent saltmarsh, mud flats, sandy beaches, rocky shoreline and island areas, open water areas associated with estuaries and bays), freshwater emergent marshes, freshwater forested wetlands, and open freshwater streams, rivers, and lakes. Characteristic birds associated with the freshwater wetlands include Common Loon, American Bittern, American Black Duck, Wood Duck, Spotted Sandpiper, and Bald

Eagle. Birds typical of saltmarshes include American Black Duck, Nelson's Sharp-tailed Sparrow, Willet, Black-crowned Night Heron, and Short-eared Owls. Coastal beaches and mudflats provide nesting and feeding habitat for colonial waterbirds (e.g., Roseate Tern, Common Tern, Arctic Tern) and several shorebirds (e.g., Piping Plover, American Oystercatcher), as well as migrating stop-over habitat for many shorebirds (e.g., Semi-palmated Sandpiper, Red Knot, Black-bellied Plover, Whimbrel, Short-billed Dowitcher, Sanderling, Least Sandpiper). Rocky shorelines and islands provide breeding habitat for seabirds (e.g., Common Eider, Great Cormorant, Northern Gannet, Leach's Storm-Petrel, Atlantic Puffin, Razorbill) and migrating/wintering Purple Sandpipers. Open water, near-shore areas (including estuaries, channels, and bays) support significant numbers of migrating and wintering waterfowl and waterbirds, including Common Eider, Black Scoter, Common Goldeneye, Long-tailed Duck, Harlequin Duck, Black Guillemot, Razorbill, Red-throated Loon, Common Loon, and Red-necked Grebe.

1.2. Land Use History

The land use history of BCR 14 reflects the difficult terrain and weather conditions typical of this region. Human populations have never been large in this part of the continent and continue to be sparse throughout much of this BCR, with the largest concentrations in coastal areas and along major river valleys. Vast areas in northwestern Maine, northern New Brunswick, and Quebec are largely uninhabited, and only recently have been roaded. Initial exploitation of forest resources was close to coastal habitations, opening a strip along the Maritime and Maine coasts. Settlement and farming in the regions away from the coast generally began after 1750. Agriculture was never a major land-use in the region, amounting to roughly 10% -15% of the land being cleared during its maximum extent in the early 1900s. (Hodgman and Rosenberg 2000). However, important agricultural areas still remain in the BCR in parts of the Maritime provinces, Quebec, and Maine.

The major land use since European settlement has been harvesting of the extensive forest resources. The first cutting largely supplied the worldwide ship-building industry for much of the 19th century. In the 1900s, pulp and paper production became the primary use of commercial forests. Large pine and mature spruce were the primary species of interest to early timber operators, and transport to mills occurred along rivers. Log driving on rivers persisted until the 1970s, after which roads were built to facilitate transport. A large proportion of this commercial forestry in the U.S. portion of the BCR takes place on private lands; for example, nearly half of the forested land in Maine is owned by the forest industry. In Canada, private companies hold long-term leases, but lands remain in public (crown) ownership. Clearcutting of spruce-fir forests, and associated road-building became more intensive after the late 1960s, at least in part because of salvaging trees killed during a spruce-budworm epidemic (Seymour and Hunter 1992, as cited in Hodgman and Rosenberg 2000). Since then, some landowners have reduced the area harvested by clearcutting and have used partial harvesting methods more frequently.

In addition to timber production, recreational activities, aquaculture, and agriculture are other land uses that significantly effect portions of this BCR. Recreation is a long-standing tradition on both public and private lands, but recreational demands have influenced the designation of large expanses of wilderness on public lands in the New England states. Development of high-

elevation sites for ski resorts is a recent factor, with potential impacts on high-priority bird habitats and species. Aquaculture is another recent development that has turned into a large-scale industry in the Maritime provinces (where New Brunswick is the largest producer) and Maine. This industry is impacting near-shore marine and estuary habitats through alteration of shoreline and bottom habitat and release of excess nutrients and waste leading to eutrophication of the coastal areas. Atlantic salmon is the primary species being raised, but mussels, clams, and oysters are also produced. Revenue from aquaculture has surpassed the amount raised from any other agricultural export in New Brunswick (Olin 2001). While agriculture is not a major land use for the BCR as a whole, blueberry and potato production are significant land uses in parts of eastern Maine, and agriculture is a major land use on Prince Edward Island, as well as parts of the St. John and Connecticut River valleys.

1.3. Conservation Issues

The Atlantic Northern Forest BCR contains a wealth of natural resources, particularly in terms of forest, water, and wildlife, but it also faces numerous threats to those resources. These threats define many of the major bird and habitat conservation issues for this BCR. In the forested portions of the region, the major conservation issue revolves around how to balance the management of the extensive forest resources for the benefit of both human needs for timber resources and ecological needs for supporting biodiversity across the spectrum of forest successional stages. In general, the southwestern portion of the BCR (e.g., Adirondack region of NY, Vermont, and New Hampshire) is facing declines in availability of early successional forest habitats, while the northern portion of the BCR (especially New Brunswick) will be facing shortages of older-aged forests as harvest rotation periods shorten on Crown-owned and industrial forest lands. True old growth forest is a rare commodity across the entire BCR, while the sale and subdivision of privately owned forest lands is another region-wide concern. Working forest easements and the development of sustainable forestry initiatives have become more common across the Northern Forest and provide promise for ecologically sound forest management, but these efforts need to be closely monitored and evaluated to determine their true conservation value. Overall forest health issues relating to the spread of various invasive forest pest species and atmospheric deposition of toxic substances (such as mercury, acid rain) represent additional concerns across the region.

In coastal areas, aquaculture represents a threat to birds by reducing habitat availability, increasing eutrophication and pollution, and in some instances increasing disturbance. Shoreline erosion and threats from various types of pollution (including oil spills) are also issues of concern for the conservation of birds across BCR 14.

Two issues that impact both terrestrial and aquatic habitats are wind power and the continuing expansion of human development. Interest in wind power as an alternative renewable energy source has increased rapidly in recent years. Efforts are underway to increase the proportion of electric power generated from wind and other renewable sources; in the U.S., federal tax incentives are available to energy companies for wind power projects. Exposed mountain summits or ridge crests generally have high wind power potential, making them likely targets for wind power development. Some off-shore areas also have high wind power potential, which has led to interest in off-shore wind power projects in these areas. Impacts of wind power “farms” on birds is largely unknown for both terrestrial and off-shore sites in eastern North America,

although the potential exists for sites that have high wind power potential to lead to increased bird mortality if wind power is developed at those sites.

Continued human development is a major concern across this BCR, including such actions as suburbanization radiating outward from population centers, construction of second homes along the seacoast and lakefronts, and development of ski areas in the mountains. The activities associated with human development tend to reduce natural habitats for birds, increase disturbance of birds from increased human presence, increase populations of some predators, and lead to increased pollution or spread of invasive species.

2. Vision and Goals

2.1. Vision

The vision for the BCR 14 effort includes a cooperative, coordinated approach across jurisdictional boundaries to addressing conservation issues in order to restore and maintain populations of the region's birds as key components of healthy ecosystems and for the benefit of current and future generations:

“Integrate international planning and implementation efforts among bird conservation initiatives across the Atlantic Northern Forest in order to restore and sustain, at the landscape level, populations of native birds and their habitats in this region.”

2.2. Goals

The following goals help to identify accomplishments that will be needed to move the BCR partnership toward realizing its vision:

- Identify priority species and their associated habitat (e.g., species-habitat suites).
- Undertake targeted research and monitoring to fill gaps in our basic knowledge of priority species, including identifying factors that limit population growth and knowledge of population size and trend.
- Develop population objectives for priority species (where applicable) and develop habitat objectives for helping to meet the population objectives. Where habitat availability is not a major limiting factor, develop objectives for reducing impacts of other limiting factors.
- Identify priority projects (e.g., management, restoration, acquisition, research, monitoring, and outreach) that will help meet population and habitat objectives, and identify focus areas for conservation actions.
- Develop geospatial resources for mapping and tracking habitat/land use trends, modeling habitat associations, and identifying focus areas.
- Implement priority projects and conservation actions, especially within focus areas, through state/provincial, regional, and international partnerships.
- Develop evaluation protocols for monitoring progress toward population and habitat objectives for adaptive management purposes.

3. Biological Foundation

A key component in the framework for a solid conservation design and delivery process is establishing a sound biological foundation upon which implementation actions are based. The

biological foundation for the BCR 14 effort includes three primary pieces: 1) species prioritization, 2) grouping of priority species by habitat types into priority species-habitat suites, and 3) establishing population and habitat objectives, which if met, will achieve the goal of restoring and/or sustaining healthy bird populations within the priority species-habitat suites. The BCR 14 workshop in Maine helped to bring existing biological pieces together to form the integrated foundation necessary for this all-bird BCR effort to move forward. The workshop completed the task of assembling the first two pieces of the biological foundation – the species prioritization and the description of priority habitats. The remaining pieces have been worked on since the workshop and are presented in this document to the extent they are complete, although considerable work still remains to develop meaningful objectives for many of the priority species and habitats.

3.1. Existing Conservation Plans and Other Biological Tools

A considerable number of conservation plans that address various aspects of bird conservation within BCR 14 already existed at the time this BCR initiative began, as did numerous other biological tools that can assist in developing and evaluating priority species and biological objectives. The following list describes the existing conservation plans and other the biological resources that were used in building the biological foundation for the BCR 14 initiative and that are available to assist in evaluating progress toward the objectives set out in this document.

- i) *Existing conservation plans* – these existing products provide much of the backbone upon which the foundation for establishing priority species and the biological objectives for this BCR initiative is based. These plans include taxon-specific plans for the four major bird conservation initiatives (i.e., the “four pillars” – waterfowl, landbirds, shorebirds, and waterbirds), ecosystem-based planning efforts (such as The Nature Conservancy’s Northern Appalachian ecoregional plan), jurisdictional- and agency-specific plans (such as New Brunswick’s Forest Management Agreements, Maine’s “Beginning With Habitat” initiative, and the U.S. Forest Service’s national forest management plans), and species-specific plans (such as the Black Duck Joint Venture plan, the regional tern management handbook, woodcock management plan, and recovery plans for threatened and endangered species). [Appendix A](#) contains an annotated bibliography with citation, contacts, and brief summary of information available from each of these existing plans. A detailed summary of specific conservation objectives and recommended actions from the existing national and regional plans applicable to BCR 14, organized by priority species within priority habitats has also been compiled – see further discussion under *Population and Habitat Objectives* section.
- ii) *Land cover and ecological land type maps* – The Nature Conservancy has created a seamless land cover map (Fig. 3) for all of BCR 14 using remotely sensed Landsat TM data for the U.S. and Quebec and generalized stand data from New Brunswick, Nova Scotia, and Prince Edward Island, combining these different data sources into a consistent cover type classifications across the BCR. Based on these data, we are able to describe the amounts of the different land cover types occurring across the entire BCR and within each state and province (Fig. 4). BCR 14 encompasses an area greater than 88 million acres, of which nearly 85% is classified as some type of forest (including regenerating forest). Of the broad categories of forest that could be classified across the BCR, evergreen forest occupies the largest total area (23.9 million acres), with deciduous forest and mixed forest occupying nearly identical amounts of area (21.9 and 21.8 million acres, respectively). New Brunswick contains the largest amount of evergreen forest (6.67 million acres) among all the

jurisdictions, while Maine supports the largest amounts of the deciduous (4.7 million acres) and mixed (6.33 million acres) forest classes among all the jurisdictions. Maine also contains the largest amount of forest wetland (728,000 acres) of any of the jurisdictions in the BCR, while New Brunswick and Nova Scotia both have over 615,000 acres of the emergent herbaceous wetland category within their boundaries – far and above what any other jurisdictions supports. Quebec, Nova Scotia, New Hampshire, Vermont, and New York all contain greater than 4 million acres of forest in their portions of BCR 14. Agriculture accounts for the largest amount of non-forest land cover (5.7 million acres), while there are also approximately 2 million acres of residential/commercial/industrial development in the BCR. Quebec supports the largest amount of agriculture in the region (1.53 million acres) but Prince Edward Island has, by far, the largest percentage of its area in agriculture (40%). A complete table with the amount of each land cover type in each state or province is provided in [Appendix B](#). TNC has developed a map of ecological land units (Fig. 5), which combines land cover types with various measures of surficial geology and environmental moisture, to produce a more detailed representation of ecological niches across the region. The ecological land units have been combined with cover type information to provide a more detailed analysis of fine-scale ecological systems (Fig. 6). The Nature Conservancy has also developed an extensive library of remotely sensed data for BCR 14. For more information, contact [Mark Anderson](#).

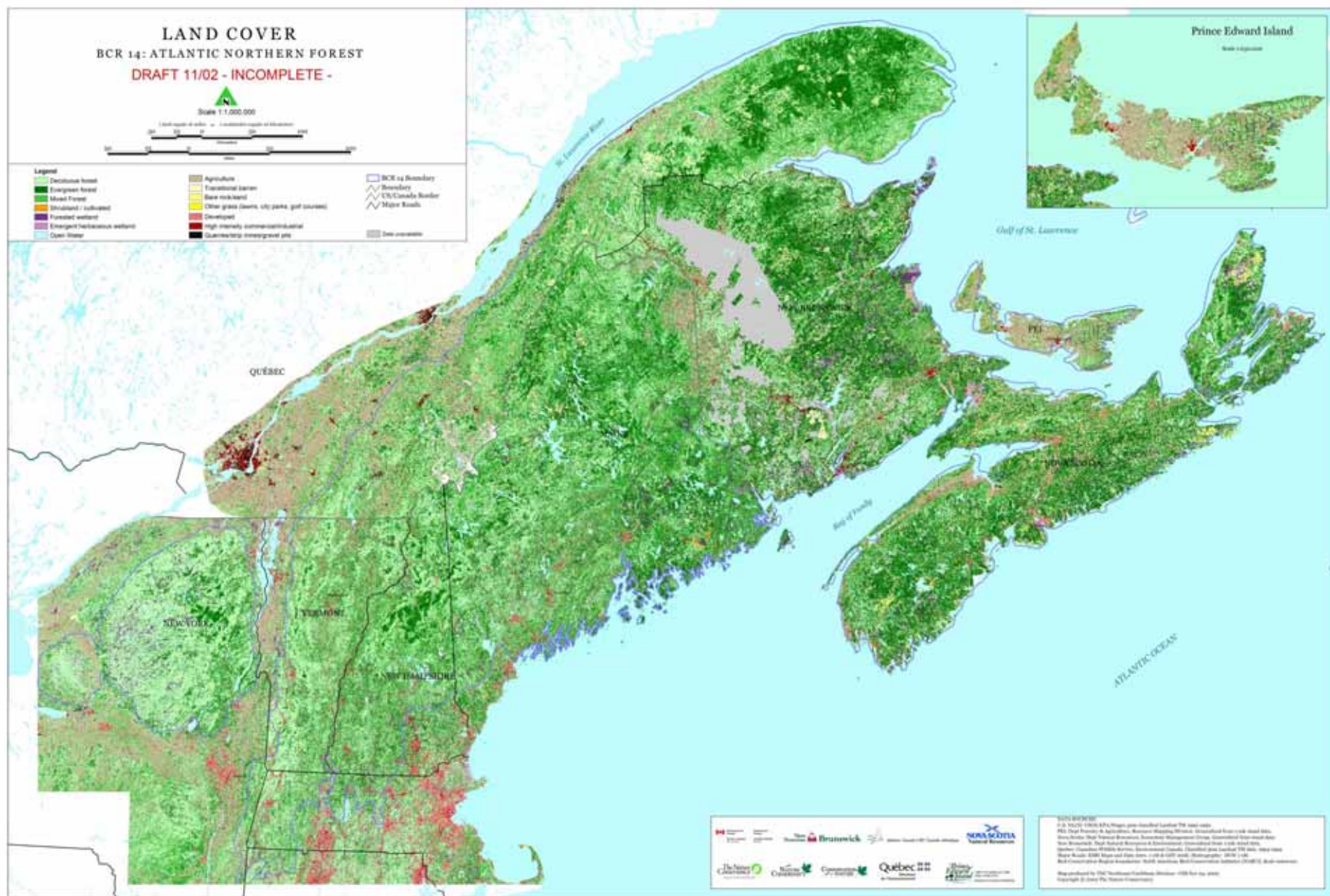


Figure 3. Map of land cover types within the Atlantic Northern Forest BCR.

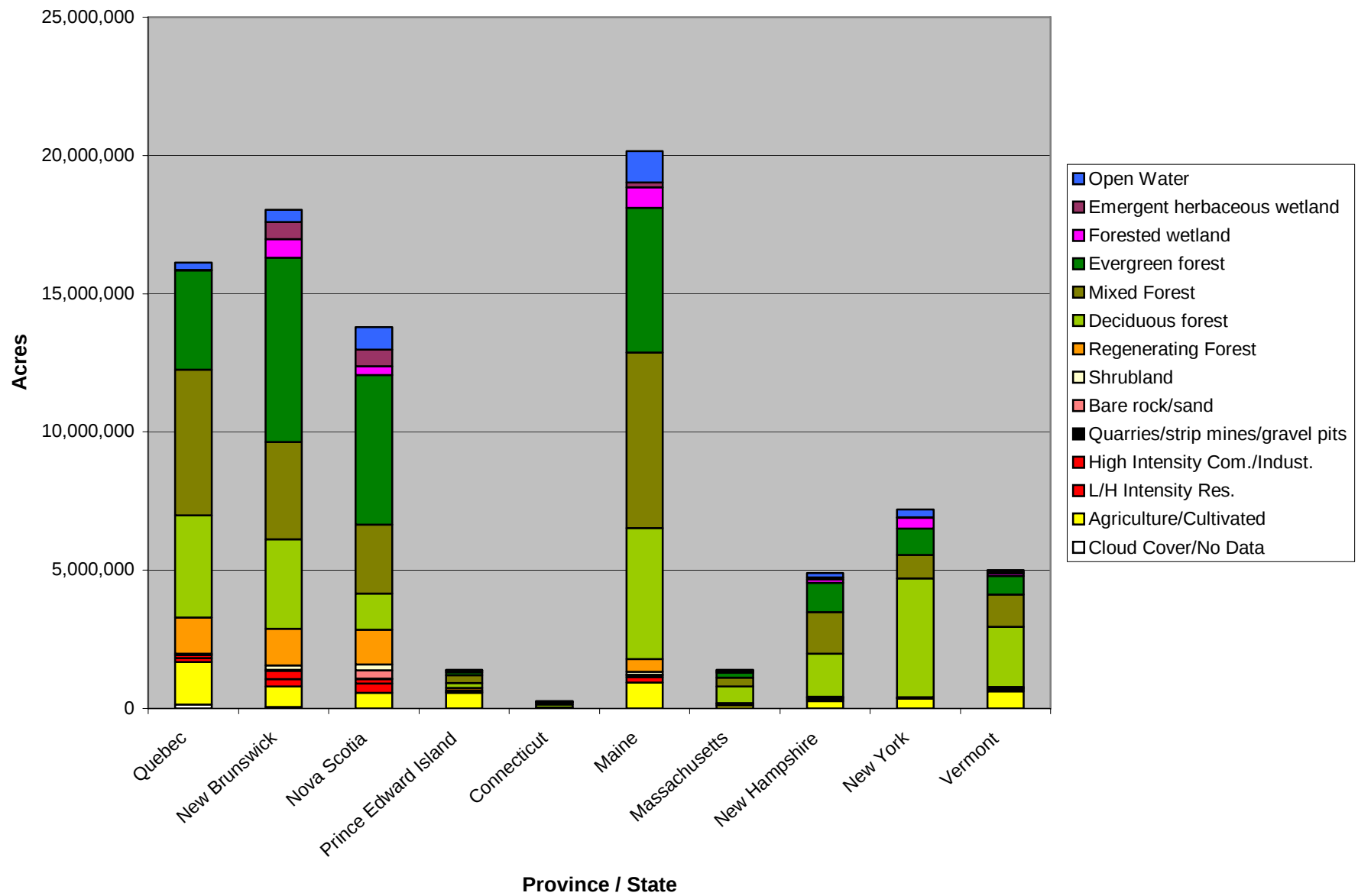


Figure 4. Acreage of land cover types within the BCR 14 portion of states and provinces.

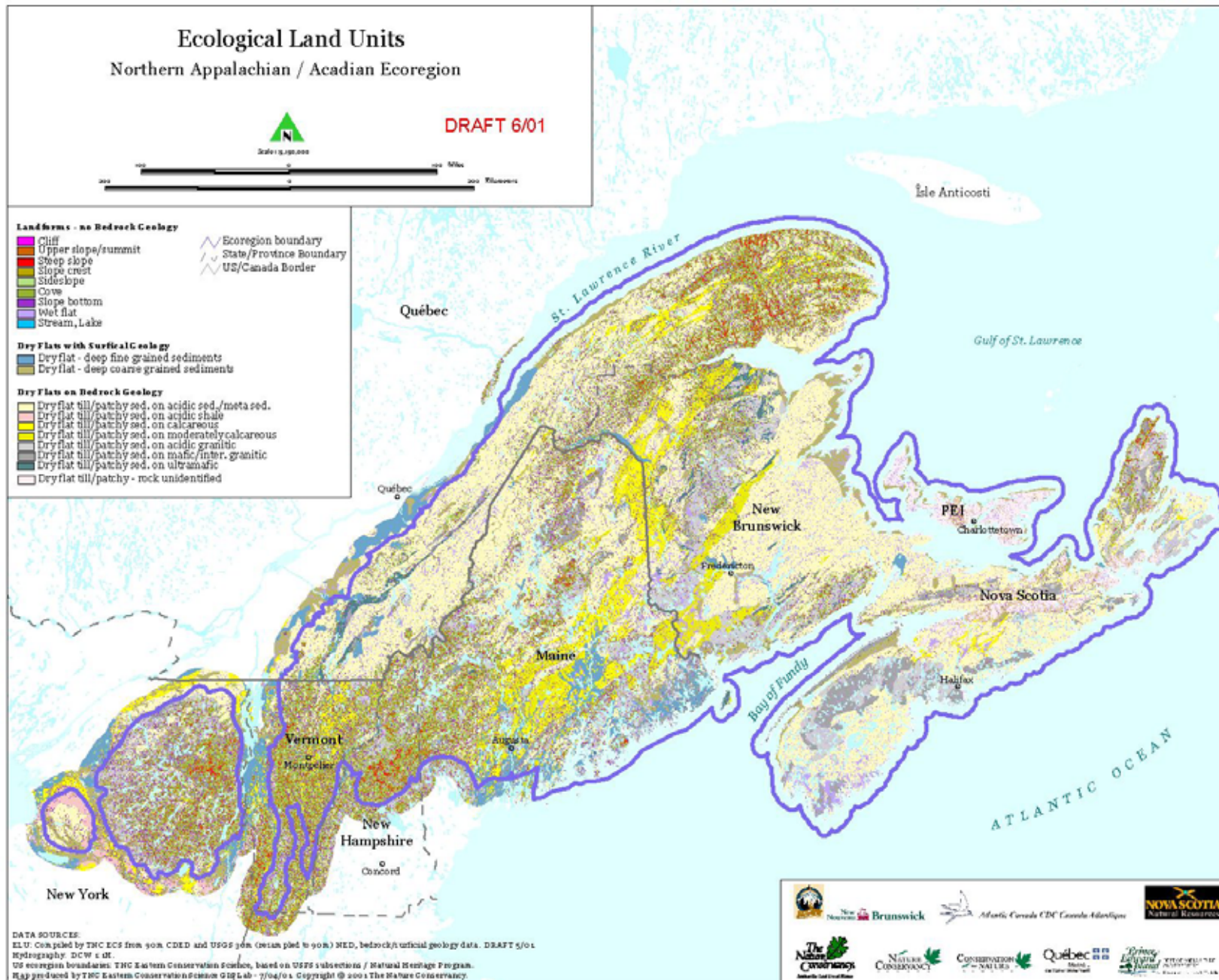


Figure 5. Map of Ecological Land Units in the Northern Appalachian Ecoregion, as defined by The Nature Conservancy.

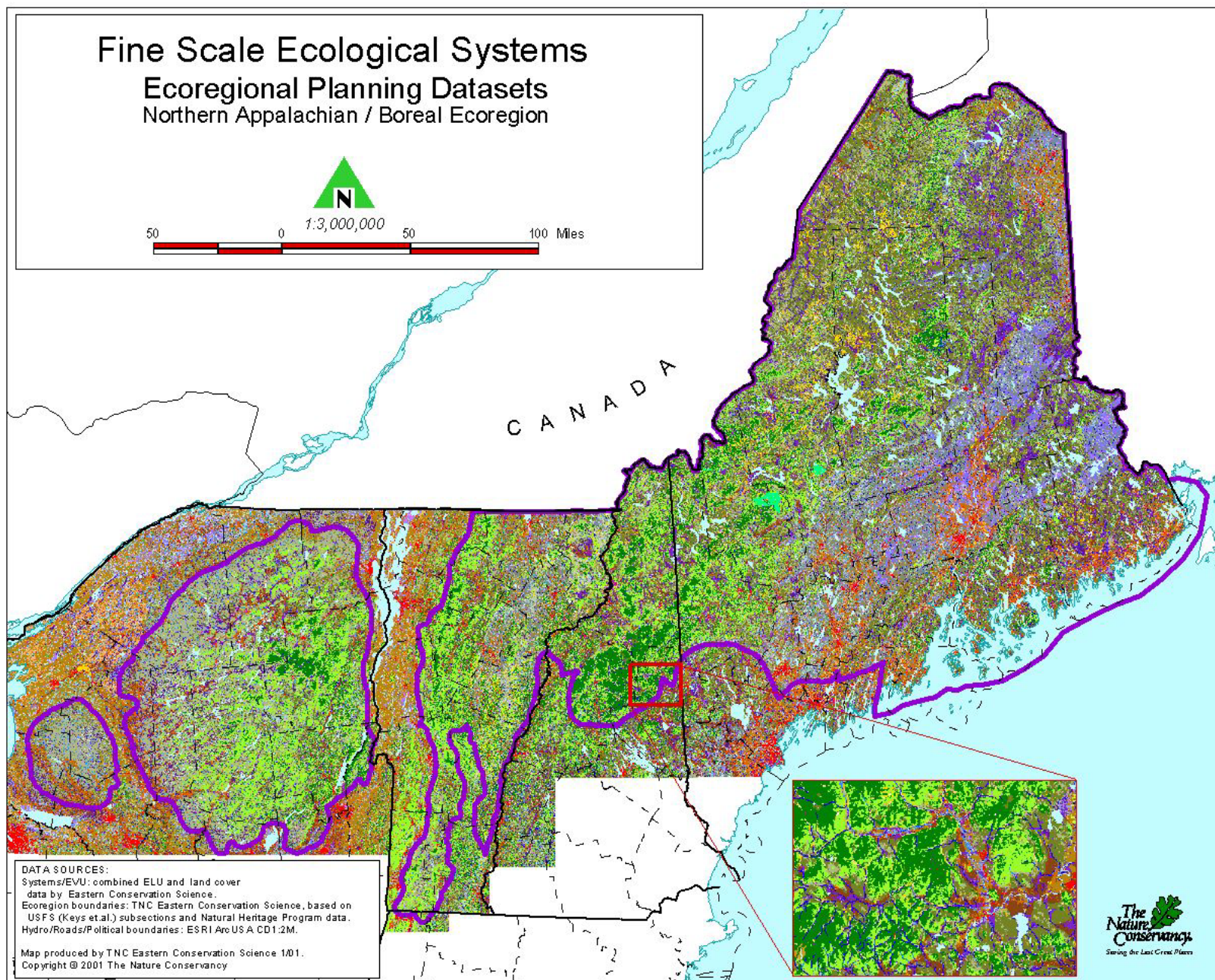


Figure 6. Map of fine-scale ecological systems, which reflect a combination of land cover and ecological land units, for BCR 14.

- iii) *Breeding Bird Survey (BBS) maps of bird distribution, relative abundance, and population trend* – maps of these analyses, as well as raw data, covering Canada and the U.S. are available from the USGS Patuxent Wildlife Research Center's [BBS website](#). The BBS data are essential to almost all aspects of landbird conservation planning, and these data can provide useful information for some breeding species of other taxonomic groups. In addition to the standard maps and analyses available on the website, maps of distribution and trends at the scale of BBS blocks and 30-minute blocks have also been created to assist in addressing issues at finer scales. Contact [John Sauer](#) for more information about these additional analyses.
- iv) *Bird-habitat models* – several projects have been undertaken to model bird-habitat relationships within various parts of BCR 14. These efforts include models of bird distribution developed as part of the GAP Analysis efforts in each U.S. state ([Maine](#), [Vermont & New Hampshire](#), and [New York](#)). Another habitat modeling project that is applicable to BCR 14 is the [Gulf of Maine Habitat Analysis](#) developed by the USFWS Gulf of Maine office. This project developed models that relate bird occurrence to habitat types and landscape-level habitat configuration and then mapped predicted suitable habitat for species of concern throughout the Gulf of Maine watershed. Models for several BCR 14 priority bird species were applied across the U.S. portion of BCR 14 as a pilot project to see if these models were appropriate beyond the Gulf of Maine watershed. For selected priority species, TNC has developed preliminary models of bird distributions across the BCR based on BBS data and ecological systems data.
- v) *Waterfowl surveys and objectives* – annual mid-winter waterfowl inventories are conducted by federal and state agencies to obtain annual indices of wintering waterfowl populations along the Atlantic Coast. Data and analyses are available from the USFWS [Migratory Bird Data Center](#) website. Waterfowl population objectives for different flyways are presented in the 2004 update of the North American Waterfowl Management Plan. Since many of the priority waterfowl species in BCR 14 are primarily migrating or wintering species in the BCR, the mid-winter inventories provide a means of tracking wintering population trends and distributions. However, surveys for breeding American Black Ducks and seaducks are conducted annually.
- vi) *Shorebird surveys and population estimates* – regional assessments of important sites for monitoring shorebird are being developed as part of PRISM, which seeks to accomplish the monitoring goals of the U.S. and Canadian shorebird conservation plans. Preliminary information for the assessment of the North Atlantic region has been compiled and is available at <http://www.shorebirdworld.org/fromthefield/PRISM1.htm>. These assessments are based in large part on International Shorebird Survey data, which are housed at the Manomet Center for Conservation Biology and are also available for review. Contact Stephen Brown for more information on shorebird survey data.

In addition to survey data, shorebird population estimates have been presented at the continental level in the [Canadian Shorebird Conservation Plan](#) and the [U.S. Shorebird Conservation Plan](#), as well as at the regional level in the [Northern Atlantic shorebird plan](#).

- vii) *Waterbird surveys, population estimates, and site data* – surveys of waterbird colonies along the Atlantic Coast have occurred regularly in both Canada and the United States.

Summaries of these survey data for individual species, including regional population estimates, are part of the species profiles that have been completed through the regional waterbird planning process by [MANEM](#). Summaries of waterbird sites by jurisdictions as well as site-specific data are also being compiled and made available on the [MANEM website](#). Access to colonial waterbird survey data from the mid 1990s for Atlantic coast states, as well as some colonial waterbird atlas data from Canada and the U.S., is available on the [Patuxent Wildlife Research Center waterbird database](#).

- viii) *Landbird population estimates and objectives* – with the completion of the Partners in Flight’s North American Landbird Conservation Plan (Rich et al., 2004), population estimates for landbirds are available at the continental, BCR, and jurisdictional scales. See the *Population and Habitat Objectives* section for discussion of landbird estimates pertaining to BCR 14. These estimates are based on extrapolations of relative abundance data from the Breeding Bird Survey and employ several simplifying assumptions about detection probabilities and about survey routes representing random samples of habitat within a geographic area. Correction factors for detection distances and time of day detectability were also calculated and applied to the population estimates. Details on the methods for deriving these population estimates are provided in Rosenberg and Blancher (In Press). Contact [Ken Rosenberg](#) for more information.
- ix) *Breeding Bird Atlases* – Breeding bird atlas projects have been completed for all the provinces and states within BCR 14. These efforts produce a snap-shot in time of the breeding distribution of all breeding birds within each jurisdiction. Atlas projects typically attempt to identify all birds that are breeding within every atlas block in a jurisdiction. Atlas blocks are the geographic areas that form the basic survey units – typically 25 km² areas in the U.S. (Laughlin and Kibbe 1985, Adamus 1987, Andrie and Carroll 1988, Bevier 1994, Foss 1994, Petersen and Meservey 2003) but 100 km² areas for the atlas efforts in the Maritime provinces (Erskine 1992) and Quebec (Gauthier and Aubry 1996). New York is currently conducting field work for its second breeding bird atlas, and interim data can be previewed on the [New York State Breeding Bird Atlas website](#).

3.2. Species Prioritization

During the BCR 14 workshop held in Maine during December 2002, participants compiled lists of priority species organized by the four major taxonomic bird groups. Work on these lists began during a series of pre-meetings prior to the Maine workshop and then were revised further through email and phone conversations following the workshop to arrive at the current version, which integrates all bird groups into a single list. This list reflects the priorities already identified in the different bird initiative plans, as modified through the collaborative assessment process engaged in during and after the Maine workshop. For this list, three categories were used to identify priority species – *Highest, High, and Medium* - based on rules and criteria (Table 1) agreed upon at the Maine workshop, with some modification by each taxonomic group to accommodate differences among and special issues associated with each group. [Appendix C, Part 1](#) provides the details on how the taxonomic groups applied the rules and criteria in Table 1 to come up with the resulting BCR 14 priority species list (Table 2). This approach to prioritization facilitated the assignment of species to categories based primarily on objective criteria, with each species being evaluated using information from the continental/national and regional bird conservation plans of the four major bird initiatives. However, additional subjective expert opinion was occasionally used to resolve situations where information was

lacking, or where data from different parts of the BCR suggested quite different levels of abundance or concern. The categories reflect levels of priority for conservation action, but no ranking is assigned to the species within each category - all are simply considered as members of priority pools.

Table 1. Conservation priority categories for bird species in BCR 14.

Priority	Criteria/Rule
HIGHEST	High BCR Concern <i>and</i> High BCR Responsibility <i>and</i> (High or Moderate Continental Concern)
HIGH	High Continental Concern <i>and</i> Moderate BCR Responsibility OR Moderate BCR Concern <i>and</i> High BCR Responsibility
MODERATE	Moderate BCR Concern <i>and</i> Moderate BCR responsibility OR High Continental Concern and Low BCR Responsibility OR High BCR Responsibility <i>and</i> Low BCR Concern

A fourth category – *Management Concern* – was used to identify species for which management is deemed beneficial in order to reduce conflicts with humans, to improve ecosystem health, or to maintain recreational opportunities.

The BCR 14 Priority Species List (Table 2) currently contains a total of 103 species and should be a dynamic list that is revised periodically to reflect new information that becomes available over time. A data sheet has been completed for each priority species (except shorebird data sheets are still being completed). Each data sheet provides information on the species' population status; the importance of BCR 14 to the species; conservation issues and threats in the region; monitoring, research and outreach needs; and suggested conservation objectives for its primary habitat type(s) and critical focus areas/sites. Data sheets are provided in [Appendix C, Part 2](#) with links for individual species from the Priority Species List below.

Table 2. BCR 14 Priority Species List, with primary season/s of occurrence: breeding (B), migration (M), winter (W).

<u>Highest Priority</u>		
American Woodcock (B)	Common Eider (B,W)	Piping Plover (B)
Barrow's Goldeneye (W)	Eastern Harlequin Duck (W)	Purple Sandpiper (W)
Bay-breasted Warbler (B)	Great Cormorant (B,W)	Red-necked Phalarope (M)
Bicknell's Thrush (B)	Greater Shearwater (M)	Semipalmated Sandpiper (M)
American Black Duck (B,W)	Ipswich Savannah Sparrow (B)	Wood Thrush (B)
Canada Warbler (B)	Nelson's Sharp-tailed Sparrow (B)	

High Priority

American Golden-Plover (M)	Cape May Warbler (B)	Red Knot (M)
American Redstart (B)	Chestnut-sided Warbler (B)	Red-necked Grebe (W)
Arctic Tern (B)	Chimney Swift (B)	Red Phalarope (M)
Black-bellied Plover (M)	Common Nighthawk (B)	Roseate Tern (B)
Black-crowned Night Heron (B)	Common Tern (B)	Ruddy Turnstone (M)
Black Guillemot (B,W)	Eastern Wood-Pewee (B)	Rusty Blackbird (B)
Black Scoter (W)	Herring Gull (B,W)	Short-billed Dowitcher (M)
Black-throated Blue Warbler (B)	Long-eared Owl (B)	Upland Sandpiper (B)
Blue-winged Warbler (B)	Northern Gannet (B)	Veery (B)
Bobolink (B)	Olive-sided Flycatcher (B)	Whimbrel (M)
Boreal Chickadee (B,W)	Purple Finch (B,W)	Yellow-bellied Sapsucker (B)
Canada Goose - N. Atlantic Pop. (M)	Razorbill (B,W)	Red Knot (M)

Moderate Priority

American Bittern (B)	Common Loon (B,W)	Peregrine Falcon (M)
Atlantic Brant (M)	Gray Jay (B,W)	Pine Grosbeak (B,W)
Atlantic Puffin (B,W)	Greater Scaup (W)	Red-throated Loon (W)
American Oystercatcher (B)	Horned Lark (B)	Rose-breasted Grosbeak (B)
Bald Eagle (B,W)	Horned Grebe (W)	Ruffed Grouse (B,W)
Bank Swallow (B)	Hudsonian Godwit (M)	Sanderling (M)
Barn Swallow (B)	Killdeer (B)	Semipalmated Plover (M)
Black-backed Woodpecker (B,W)	Leach's Storm-Petrel (B)	Short-eared Owl (B,M)
Black-billed Cuckoo (B)	Least Sandpiper (M)	Surf Scoter (W)
Blackburnian Warbler (B)	Long-tailed Duck (W)	Vesper Sparrow (B)
Black-legged Kittiwake (W)	Northern Flicker (B)	Whip-poor-will (B)
Blackpoll Warbler (B)	Northern Goshawk (B,W)	Willet (B)
Black-throated Green Warbler (B)	Northern Harrier (B)	Wilson's Snipe (B)
Boreal Owl (W)	Northern Parula (B)	Wood Duck (B)
Brown Creeper (B,W)	Ovenbird (B)	Yellow-bellied Flycatcher (B)
Common Goldeneye (B,W)	Palm Warbler (B)	Yellow Rail (B)

Management Concern

Resident Canada Goose (B,W)
Greater Snow Goose (M)
Mallard (B)

3.3. Priority Habitats and Species-Habitat Suites

Fifteen general habitat types were identified during the BCR 14 workshop as important for supporting one or more of the priority bird species during at least one of their life stages (Table 3). These habitats are either in need of critical conservation attention or are critical for long-term planning to conserve continentally and regionally important bird populations.

Table 3. Priority habitat types for BCR 14, with corresponding definitions and landcover classifications used in developing a landcover map for the region.

Habitat Type	Definition	Landcover Classification for mapping purposes
Marine Open Water	Open waters from 20 km off the coast out to the limit of 320 km for the Economic Exclusion Zone (offshore); Open waters within 20 km of the coast (nearshore)	Open Water
Estuaries and Bays	Open water lacking any vegetation, or open water dominated by plants that grow principally at or under the surface of the water - within a protected bay or estuary	Open Water
Rocky Coastline (including islands)	Exposed consolidated rocky shore with little persistent or non-persistent vegetation	Bare rock/sand
Unconsolidated Shore – beach, sand, and mudflats	Sandy shores, exposed sand flats, sandspits and gravel beaches; areas dominated by particles smaller than sand with virtually no vegetation; range of flooding regimes possible	Bare rock/sand
Estuarine Emergent Saltmarsh	Emergent marshes dominated by persistent and non-persistent vegetation – estuarine systems	Emergent Herbaceous Wetland
Freshwater Lakes, Rivers and Streams	Open water lacking any vegetation, or open water dominated by plants that grow principally at or under the surface of the water – freshwater systems (lacustrine, riverine, palustrine)	Open Water
Palustrine Emergent Marsh	Emergent marshes dominated by persistent and non-persistent vegetation – palustrine, riverine	Emergent Herbaceous Wetland
Forested Wetland	Wetlands dominated by woody vegetation greater than 6 m tall	Forested Wetland
Deciduous Forest	Forest dominated by deciduous trees	Deciduous Forest
Coniferous Forest	Forest dominated by coniferous evergreen trees	Evergreen Forest
Mountaintop forest/woodland	Forest and/or woodland occurring at high elevations	Evergreen Forest
Mixed Forest	Forest with a mix of deciduous and coniferous trees	Mixed Forest
Shrub-scrub/ Early successional	Shrub and/or sapling dominated uplands, or wetlands dominated by woody vegetation less than 6 m tall including bogs and shrub swamps	Shrubland/ Cultivated or Transitional Barren
Grasslands	Native grasslands, pastures, hay fields and fallow fields	Agriculture/Transitional Barren

Urban/Suburban	Land within municipalities, including a range of short non-native grass, shrubs, and a mix of deciduous and coniferous trees, as well as buildings and other structures providing nesting substrates	Other grass/low intensity developed
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The priority species can be sorted according to the habitat types they use most frequently, forming [Species-Habitat Suites](#) for BCR 14 (Appendix D). The highest priority species do not form cohesive habitat groups, but rather are distributed among most of the different priority habitat types within this region. Therefore, no attempt is made in this document to rank these species-habitat suites. All priority habitat types support numerous priority species and require some level of conservation attention in order to maintain long-term, healthy populations of those priority species. It will be up to the collective BCR 14 partnership to prioritize among species-habitat suites, if it decides such prioritization is appropriate.

3.4. Population and Habitat Objectives

Ideally, population objectives should reflect the population levels necessary to maintain a high probability that a species will persist in the region for a long time. Also, habitat objectives should reflect the amount of habitat necessary to support the population levels of priority species set forth in the population objectives. Knowing what the relationship should be between a population objective and the corresponding habitat objective requires knowledge about how a species' abundance and viability change as habitat conditions and quantities vary. Since our knowledge of these relationships is frequently incomplete or imperfect, the population and habitat objectives suggested at this time should be considered very rough and preliminary estimates and should be viewed with a sense of reality and skepticism. They will need to be updated and revised as better and more complete information on species-habitat relationships becomes available. Additionally, some species may not be limited by habitat availability during the breeding season, and for these species, conservation objectives addressing issues other than habitat should be developed to support the desired population goal.

It must also be recognized that for migratory species, population objectives are most meaningful for species whose primary season of occurrence in the BCR is during the breeding season. Estimating populations of migrating and wintering species in a region is complicated by the movements of individuals among locations and the interchange of individuals at any specific location during migration and within different parts of the wintering season. Also, annual variability in the numbers of birds either migrating through or wintering in a given location is often high. The relationships between local habitat conditions and abundance of birds is less direct during migration and wintering than during breeding because of the larger number of factors external to the local conditions that determine how many birds will pass through a particular area. Setting population objectives is also not very meaningful when it is difficult to estimate the size of the population using an area during the migration or wintering periods. Better methods for monitoring population sizes and trends using survey data from the migration and wintering period are necessary to improve our ability to set and monitor population goals for the migrating and wintering species in BCR 14, especially the shorebirds, waterfowl, and pelagic waterbirds.

Even with the many limitations that impact our ability to develop and evaluate progress toward population and habitat objectives, having even preliminary estimates for these objectives serves the purpose of informing the conservation delivery process as to what kind of actions need to be implemented to begin working toward achieving the goal of sustained populations of priority species. This concept has commonly been used by the major bird conservation initiatives in setting population goals at the continental level. The objectives set at the BCR scale should reflect a stepping-down of the continental level goals to a particular BCR and should indicate that region's contribution to the overall continental goal. Likewise, BCR level objectives can be stepped down to smaller geographic areas such as jurisdictions or focus areas, with the contributions of all the smaller areas adding up to the overall BCR objective. The objectives set for BCR 14 reflect this approach. In addition, consideration should be given to the idea that population goals for smaller geographic areas are best defined in terms of demography-based objectives (e.g., reproductive rates, survival rates, body condition) rather than objectives for population size, which can be highly influenced by factors outside of small geographic areas.

[Appendix E, Part 1](#) provides a detailed summary of specific conservation objectives and recommended actions from existing bird initiative plans, organized by priority species within priority habitats (i.e., species-habitat suites). The recommendations include estimates of current populations along with recommended population and habitat objectives where such information was available at the time of the current draft of this document. [Appendix E, Part 2](#) breaks down specific population and habitat objectives from the BCR level to the contributions for which each jurisdiction is responsible in order to support the total BCR objective. Such population and habitat objectives have been proposed primarily for landbirds and waterfowl at this time, but the other bird groups are working on developing similar objectives. All such objectives presented in this document should be considered preliminary and in need of much further review and revision. They are provided mostly as suggestions for bird conservationists throughout the BCR to consider as initial conservation targets and to promote further discussions about objectives.

4. Implementation and Evaluation

Implementation of the BCR 14 plan will entail undertaking the actions recommended in the various bird initiatives' plans, as summarized in [Appendix E](#), in conjunction with the specific activities recommended in the following sections on focus areas and priority projects, which are intended to identify some of the most important actions and locations for initial bird conservation work by the BCR 14 partnership. The purpose for undertaking these implementation actions is to contribute to the BCR 14 habitat and population objectives discussed in the previous section. These actions will include various forms of habitat conservation (e.g., protection from development, active management, restoration from degraded conditions), monitoring of bird populations and habitat conditions, conducting research projects to fill information gaps, and undertaking education/outreach activities to raise awareness of the bird conservation issues in the region and communicate solutions for those issues to the public and private sectors. As implementation moves forward, periodic evaluations of progress toward the habitat and population objectives will need to be conducted to determine if the actions that have been taken are having the intended effects.

4.1 Focus Areas for Habitat Conservation

One of the tools of conservation design being used to foster implementation in the BCR 14 initiative is the focus area concept. These geographically explicit areas correspond to the general habitat affinities of priority birds. While other areas within the BCR do or could provide high quality bird habitat, focus areas are intended to have high conservation and restoration potential at a landscape scale because they have been identified by partners within the BCR as areas with significant biological value (e.g., large blocks of high quality habitat, large concentrations of birds), with significant public lands that can provide a core for conservation efforts, and/or good potential for public-private partnerships. Atlantic Northern Forest focus areas were defined by technical staff of partner agencies and organizations during the Maine workshops held in December 2002. These focus areas should be considered an initial draft list for the BCR and will need to be revised and enhanced through a further review process. Focus areas were identified independently for each taxonomic group; these areas have been digitized. Maps of focus areas for each bird group have been created, as well as a composite map with the focus areas for all bird groups ([Appendix F](#)). The composite map illustrates where overlap occurs in areas considered to be important for the different taxonomic groups and where conservation efforts can benefit multiple groups of birds. However, it should also be recognized that focus areas with habitat for only one taxonomic group are not necessarily less important than focus areas supporting multiple group of birds, because they might be extremely important for some of the highest priority species in that single bird group. Data sheets for each focus areas are also presented in [Appendix F](#). These data sheets provide site descriptions, importance of the area to priority birds, threats to the area, conservation actions needed, protection status of the area, and a knowledgeable contact person.

4.2. Other Approaches to Identifying Important Areas for Habitat Conservation

The focus area concept works well for identifying important habitats that occur in fairly discrete patches, either as large blocks or as major components within a landscape, and are likely to remain in the same habitat type and successional stage for a relatively long time. Wetlands and grasslands are examples of general habitat types that lend themselves well to the focus area concept in BCR 14. However, the focus area approach is difficult to apply to expansive habitat types (i.e., “matrix” habitats) that extend over very large areas with minimal variation at the most coarse levels of habitat description, such as the vast forested areas of BCR 14. Identifying geographically-explicit areas that have high habitat values for priority species compared to other areas is not a simple task. Other approaches and tools will need to be developed and applied in BCR 14 for these other habitat types. This primarily applies to forests and forest-associated birds, including the full suite of successional stages and myriad forest types. Methods incorporating bird-habitat models, forest growth simulations, and collective knowledge of management prescriptions on both public and private lands will need to be developed to determine if specific areas or landscapes within the BCR can be identified where habitat for priority forest-associated landbirds can be maintained on a long-term basis. Given the dynamic nature of the industrial forest portions of this BCR, identifying specific areas to target long-term habitat conservation actions for a particular suite of species may not be practical. Rather, long-term conservation actions for the “working forest” may need to be developed across broad spatial and temporal scales where adequate amounts of habitat for several priority species suites can be maintained within a shifting mosaic framework.

An outline for a general process that would lead to the kinds of recommendations described in the preceding paragraph is provided below. A much more detailed and specific plan for carrying out this kind of work will need to be developed in cooperation with a variety of partners. However, this outline suggests the general activities that would need to be undertaken:

(A) Select a set of focal species representing the primary forest and successional stages. Develop regional-scale bird-habitat models suitable for mapping the predicted current distributions of these focal species across the BCR. Use the mapping results to identify key areas at a very gross scale within the BCR for targeting conservation and management actions for each of the focal species.

** Note: [Mark Anderson](#) (with the TNC Eastern Resource Office in Boston) has developed preliminary bird-habitat models based on BBS data and TNC Ecological Systems data. Further development and validation work will be needed to determine the utility of these models, but they may provide products which can be used for the purposes of identifying key areas for conservation at a coarse scale. Figure 7 provides a draft example of a predicted distribution map that Mark's modeling efforts might produce.

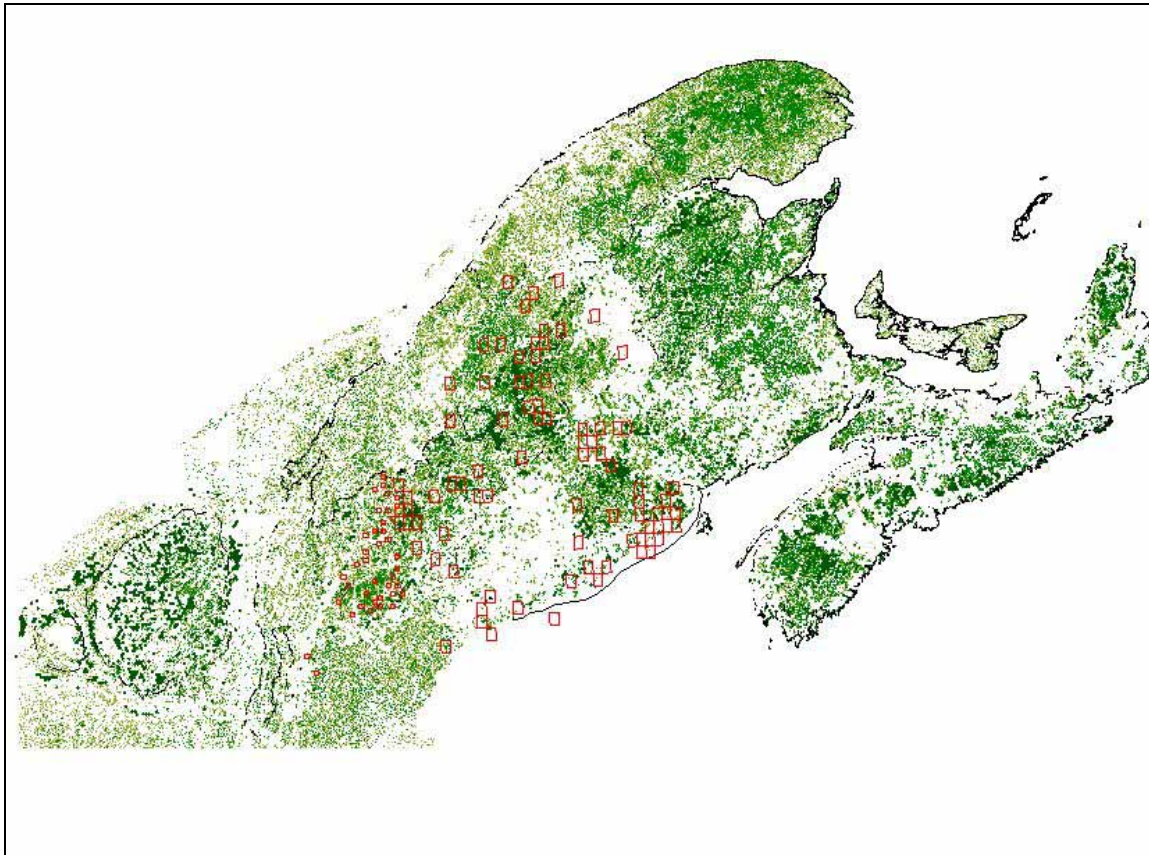


Figure 7. Map of predicted distribution for Blackburnian Warbler. Darker regions represent a higher probability of repeat occurrence over multiple years. Red squares indicate state breeding bird atlas survey areas (ME and NH only) where this species is a confirmed breeder. This is a preliminary, draft map and is presented here only as an example. **The accuracy of the model used to develop this map has not been rigorously tested.**

(B) Within the key areas for forest-bird conservation identified through (A), describe overlapping/conflicting needs of priority species in that area (e.g., if an area is a key area for multiple focal species with conflicting habitat needs) and provide recommendations on which set of habitat types should receive priority conservation attention with a particular area. Developing such recommendations will require knowledge about the distribution of priority birds and their habitats across the BCR, which the models from (A) should help to provide.

(C) Within each key area selected through (A), identify primary landowners/managers and develop dialogues with them to determine if their current forest management practices could be altered to improve habitat conditions for priority species, especially those associated with the priority habitats identified through (B). The types of landowners/managers and management practices will vary across the BCR and approaches will likely need to be tailored to the different areas within the BCR. For many priority species, current knowledge of what forest management recommendations to make in order to improve habitat for birds should be at least advanced enough so that dialogues with land owners/managers can be started. However, adequate information for making even initial recommendations might be lacking for some of the priority species, in which case initial experimental research will be needed to acquire appropriate information for making recommendations. A group of experts on bird-habitat relationships and forest management practices within the BCR should be assembled to help make these recommendations. In all cases, forest management recommendations should be developed and implemented within the framework of adaptive resource management whereby management recommendations are implemented in conjunction with proper monitoring schemes to assess bird responses to the management actions. Future management recommendations should then reflect any modifications suggested by the monitoring results.

(D) Evaluate current contribution of each key area to BCR-wide population/habitat goals for the focal species and further refine recommendations on how landowners/managers in the different areas could adjust forest management actions to help reach conservation targets (if targets are not already met). Ultimately, we would also want to predict future forest conditions based on anticipated forest management plans and try to ensure that conservation targets would be met into the future. Carrying out this step will require more complex analyses for which a detailed action plan will need to be developed, including the many assumptions that will need to be made and tested as part of this process, such as how appropriate population and habitat goals are defined and how to define landscape level breeding densities for priority species in various habitat types. Steps (C) and (D) are not mutually exclusive, but Step (D) might require more extensive technical work on conservation design and fine-scale bird-habitat modeling, which will require considerable time and financial resources to complete.

4.3. Priority Projects for Implementation

During habitat breakout sessions at the BCR 14 workshop, technical staff from the partner organizations identified priority projects that they thought were of critical importance and/or of a timely nature in terms of addressing the most pressing bird conservation issues in the Atlantic Northern Forest. These projects can be considered a “short list” of conservation actions that will benefit priority species and habitats and that partner organizations should work together to implement in the near future. [Appendix G](#) provides a list of the priority projects within major

habitat groupings, including project descriptions, priority species and habitats targeted, a key contact person for the project, and potential funding sources. Numerous on-going or recently completed projects that were initiated prior to the BCR 14 initiative also have applicability toward achieving BCR 14 objectives. These existing projects in the region are listed at the end of Appendix G.

4.4. Implementation and the BCR Partnership

The BCR 14 Partnership, which includes those agencies and organizations with an interest in working together to affect bird conservation in the Atlantic Northern Forest (see [Appendix H](#) for a list of partners and contact information), should foster and facilitate the effective delivery of bird conservation objectives across the BCR by bringing the programmatic capabilities of all partners to bear in a coordinated fashion to affect landscape change and maintenance of the region's native bird populations. Implementing the plans of the various bird conservation initiatives, which form the foundation for the BCR 14 effort, will come in many forms and will include habitat conservation activities (e.g., management, protection, restoration, enhancement), population management activities (e.g., predator control, disturbance reduction, setting harvest regulations, providing nesting structures, contaminant removal), education and outreach activities, as well as research and monitoring projects. Several specific recommendations that the BCR Partnership could undertake to foster bird conservation implementation are provided here:

- Develop working groups organized by jurisdictions that can collectively contribute to landscape design and plan implementation at multiple spatial scales (e.g. regional, landscape, and project levels).
- Outline the habitat improvements or population management activities needed in each focus area and develop a plan for addressing those needs. Use acreage or population objectives to estimate the ability of those improvements to contribute to the BCR's bird population goals.
- Facilitate and enhance the ability of the BCR partners to develop and implement projects (especially within the focus areas delineated in this plan) that fulfill the BCR's mission of restoring and maintaining healthy bird populations.
- Develop strategies to integrate bird conservation objectives into private land management within the Atlantic Northern Forest.
- Work to increase funding available to BCR partners through a variety of mechanisms.

The BCR Partnership should also foster and maintain good communications among partners to facilitate cooperation in sharing information and effective/efficient use of all resources available for bird conservation. Another aspect of implementation that was brought up several times during the BCR 14 workshop was the need to develop links and partnerships with other Bird Conservation Regions that share migratory species with the Atlantic Northern Forest BCR. These relationships with other BCRs will help partners in BCR 14 better understand where within their annual cycles migratory species are facing the most stringent limiting factors and which actions that can be taken within the Atlantic Northern Forest will be most effective in positively affecting bird populations.

4.5. Evaluation of Progress toward BCR Objectives

To complete the conservation design and delivery framework discussed in the introduction of this document, methods will need to be developed for assessing how the outcomes of the

conservation actions taken by the BCR Partnership contribute to the BCR objectives. Such evaluation of progress toward objectives is a crucial component of a successful conservation initiative, but one that often is not given adequate consideration. Evaluation components may vary from simple monitoring of the results of routine management to rigorous experimental delivery of alternative management options. Regardless of how the evaluation is conducted, it must be done in such a way that it can be reconciled across multiple geographic scales and ultimately be compiled at the regional level for comparison with BCR-wide objectives.

The biological tools described in section 3.1. provide a source of existing resources for evaluation, especially with regard to monitoring bird populations. These tools have already provided a fairly good record on the current status of bird populations and can continue to be used to monitor population trends in the future. Better methods for monitoring population sizes will need to be developed for many species. Developing the means to track trends in habitat types across the BCR will also need to be developed. The BCR-wide land cover map produced for the Maine workshop is a first step toward being able to evaluate progress toward BCR habitat objectives, because it provides a general sense of current conditions. However, cost-effective techniques for tracking changes in habitats over time at different spatial scales will need to be developed if the BCR Partnership is going to be able to assess progress toward habitat goals on a periodic basis.

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Appendix A. Annotated bibliography of existing bird conservation plans

Type/Name of Document	Summary	Level of Information Available	Geographic Area	Suitability to State/Province	Availability/Contact
<i>Continental/National Plans</i>					
North American Bird Conservation Initiative Partners USFWS, International Association of Fish & Wildlife Organizations, American Bird Conservancy, Partners in Flight, Ducks Unlimited, Wildlife Management Institute, National Flyway Council, Federal Agency Subcommittee USDA Forest Service International Programs, Association of Joint Venture Management Board Chairs, Resident Game Bird Working Group	Vision: Populations and habitats of North America's birds are protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management. Goal: To deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.	Website offers: Partner links and plans Tools and resources • BCR's • Species assessment • Bird info & data • Funding resources • etc News and events	Bird Conservation Regions (BCRs) are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues. Click on the link below to find appropriate BCR. http://www.nabci-us.org/bcrs.html	Maine Massachusetts New Brunswick New Hampshire New York Nova Scotia PEI Quebec Vermont	http://www.nabci-us.org
PIF North American Landbird Conservation Plan, March 2003, Draft Authors Comision Nacional para el Conocimiento y Uso del la Biodiversidad, Bird Studies Canada, National Audubon Society, Canadian Wildlife Service, Cornell University, Rocky Mountain Bird Observatory, American Bird Conservancy, USFWS	The purpose of the plan is to provide an overview of the highest priority landbirds in North America. These birds include not only those species that are of conservation concern due to population declines and small ranges, but those that are characteristic of major habitat types and are essential to the biotic integrity and long-term stability of entire eco-regions.	Data and attributes for 448 species including continental population estimates Priority Species Suite tables for "super regions" (ie: associations of BCRs) Priority Species watch list Links to databases with PIF species assessment scores	United States and Canada	Maine Massachusetts New Brunswick New Hampshire New York Nova Scotia PEI Quebec Vermont	Ken Rosenberg Cornell lab of Ornithology Ithaca, NY 14850 607-254-2412 KVR2@cornell.edu
Canadian Shorebird Conservation Plan	The Canadian Shorebird Conservation Plan's vision is for healthy populations of shorebirds to be distributed across their range and diversity of habitats in Canada and throughout their global range. The plan thus recognizes the need to collaborate internationally as well as regionally	Population estimates and trends Priority setting system for shorebirds	Canada <i>Plan developed with input from United States</i>	New Brunswick Nova Scotia PEI Quebec	http://www.cws-scf.ec.gc.ca/publications/spec/cscp/index_e.cfm

	and locally. This plan has established goals designed to fulfill the needs for research, monitoring, and evaluation as well as conservation, communication, and international linkages.	Key staging sites in Canada for migrating shorebirds Conservation goals and implementation strategies			
U.S. Shorebird Conservation Plan May 2001, Current Edition This plan is a partnership of state, federal agencies, non-government organizations, academic institutions, and individuals from across the country.	The U.S. Shorebird Conservation Plan is a partnership involving organizations throughout the United States committed to the conservation of shorebirds. This document summarizes all of the major technical reports and recommendations produced by the various working groups that participated in developing the Plan. The organizations and individuals working on the Plan have developed conservation goals for each region of the country, identified critical habitat conservation needs and key research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face. The shorebird partnership created during the development of the Plan will remain active and will work to improve and implement the Plan's recommendations.	Hemispheric, National and regional goals Population estimate and target table (and other tables) Shorebird planning regions	United States <i>Plan developed with input from Canada, Mexico and Australia</i>	Maine Massachusetts New Hampshire New York Vermont	http://manomet.org/USSCP/files.htm
The North American Waterbird Conservation Plan, Version 1 is current and addresses colonial waterbirds Version 2 is due out 2004 and will cover marshbirds This plan is a partnership of state, US and international federal agencies, US and international non-government organizations, academic institutions, private industries, and individuals from across the country.	This document, Version 1 of the North American Waterbird Conservation Plan, provides an overarching continental framework and guide for conserving waterbirds. It sets forth goals and priorities for waterbirds in all habitats from the Canadian Arctic to Panama, from Bermuda through the U.S. Pacific Islands, at nesting sites, during annual migrations, and during nonbreeding periods. It advocates continent-wide monitoring; provides an impetus for regional conservation planning; proposes national, state, provincial and other local conservation planning and action; and gives a larger context for local habitat protection. Taken together, it is hoped that these activities will assure healthy populations and habitats for the waterbirds of the Americas.	Waterbird Conservation Region's Broad species population, habitat, education & information, and coordination & integration goals. Tables including: • Conservation status & distribution • Population estimates and conservation status • Distribution and activity Ideas for outreach projects	North America, Central America, the islands and pelagic waters of the Caribbean Sea and western Atlantic, the U.S.-associated Pacific Islands, and pelagic waters of the pacific.	Maine Massachusetts New Brunswick New Hampshire New York Nova Scotia PEI Quebec Vermont	Available in hard copy only: Scott Johnston, USFWS Hadley, MA 01035 413.253.8557 Scott_Johnston@fws.gov
North American Waterfowl Management Plan,	Recognizing the importance of waterfowl and wetlands to North Americans and the need for	Very broad visioning and population goals and	United States, Canada, Mexico	Connecticut Delaware	http://northamerica.fws.gov/NAW

Updated in 1998 In Canada the Plan is administered by the North American Wetlands Council In the U.S. the Plan has become a network of Joint Ventures with a variety of partners including several federal land-management agencies, state agencies, private corporations, and conservation organizations In Mexico conservation under the Plan is coordinated through the National Institute of Ecology	international cooperation to help in the recovery of a shared resource, the Canadian and United States governments developed a strategy to restore waterfowl populations through habitat protection, restoration, and enhancement. The strategy was documented in the North American Waterfowl Management Plan signed in 1986 by the Canadian Minister of the Environment and the United States' Secretary of the Interior, the foundation partnership upon which hundreds of others would be built. With its update in 1994, Mexico became a signatory to the Plan. The Plan is innovative because its perspective is international in scope, but its implementation functions at the regional level. Its success is dependent upon the strength of partnerships, called Joint Ventures, involving federal, state, provincial, tribal, and local governments, businesses, conservation organizations, and individual citizens. Joint Ventures develop implementation plans focusing on areas of concern identified in the Plan.	objectives Important Waterfowl Habitat Areas in North America Tables include: - Population estimates for ducks in NA - Status & Goals for NA Goose Pop. - Status & Goals for NA Swan Pop. - NAWMP joint venture objectives (acres)		Maine Maryland Massachusetts New Hampshire New York New Jersey Pennsylvania Rhode Island Vermont Virginia West Virginia	MP/nawmphp.htm
<i>Regional Plans</i>					
Partners in Flight Bird Conservation plans “Landbirds” Organization launched in 1990 Partners There are approximately 200 organizations contributing to the Partners in Flight organization. To view the complete list: http://www.abcbirds.org/pif/pifsig.htm	With a focus on landbirds, especially neotropical migrants (species that breed in North America and winter in Central and South America) as well as other species requiring terrestrial habitats, PIF's premise has been to combine, coordinate, and increase the resources of public and private organizations in North and South America. PIF is a cooperative partnership between government agencies, private organizations, individuals, academic communities, and industry. Bird Conservation Plans for have been developed for Physiographic Areas in the Northeast by PIF. These plans identify priority species for conservation efforts in each area, recommend population and habitat objectives for managing these priority species, and provide implementation and management strategies for reaching objectives.	Priority habitat and suite of species lists Population estimates Habitat and population objectives Implementation strategies/management objectives outlined Research & monitoring needs identified Some outreach strategies	There are 12 physiographic areas in the northeastern U.S. http://www.blm.gov/wildlife/pifplans.htm Canada is developing regional PIF plans based on Bird Conservation Regions http://www.cws-scf.ec.gc.ca/birds/lb_ot_e.cfm	Maine Massachusetts New Brunswick New Hampshire New York Nova Scotia PEI Quebec Vermont	Bird Conservation Plans for the U.S. are available on website: http://www.partnersinflight.org/ or from Randy Dettmers Regional Canadian PIF information is available from Dan Busby (Atlantic Canada) and Jean Gauthier (Quebec)
Northern Atlantic Regional Shorebird Plan	The North Atlantic Regional Shorebird Plan steps down the goals of the continental plan to smaller	Broad Regional Goals	Encompasses all or part of the	Connecticut Delaware	http://shorebirdplans.fws.gov/Regiona

June 2000 Partners New Jersey, Delaware, Vermont, New Hampshire, Massachusetts, New York, , Rhode Island, Virginia, Maine, Center for Conservation Sciences, Natural Lands Trust, Atlantic Coast Joint Venture, Cornell Laboratory of Ornithology, The Nature Conservancy, New Jersey Audubon Society, and Manomet Center for Conservation Sciences	scales to identify priority species, habitat and species goals, and prioritizes implementation projects.	Habitat goals and objectives, management needs, research goals, education goals, funding goals Tables include: • Species priority list • Priority species list by guild-group • Estimated population • Species priority by habitat • Estimated acreage of habitat by state (excluding Connecticut and Maryland)	following states: Connecticut Delaware Maine Maryland Massachusetts New Hampshire New York New Jersey Pennsylvania Rhode Island Vermont Virginia	Maine Maryland Massachusetts New Hampshire New York New Jersey Pennsylvania Rhode Island Vermont Virginia	Shorebird/RegionalPlans.htm or Larry Niles NJ Div. Of Fish, Game & Wildlife Trenton, NJ 08625 609-292-9100 Larry.Niles@dep.state.nj.us
Atlantic Coast Joint Venture Implementation Plan, Update of the plan due in 2004 This plan is a partnership of state, federal agencies, non-government organizations, and individuals from across the country.	The goals and objectives for the Atlantic Coast Joint Venture (ACJV) significantly expand those that were identified in the North American Waterfowl Management Plan. Specifically, the ACJV objectives are to protect, manage, or enhance approximately 879,138 acres of wetland and upland buffer habitats from Maine to South Carolina. It also calls for improving or enhancing an additional 165,977 acres of federal and state wetland habitats, i.e., National Wildlife Refuges and state wildlife areas now managed for waterfowl.	Focus area maps, summaries, and tables for each state. Management strategies to achieve objectives.	Maine to Florida and Puerto Rico	Maine Massachusetts New Hampshire New York Vermont	Andrew Milliken USFWS Hadley, MA 01035 413-253-8269 andrew_milliken@fws.gov AND http://northeast.fws.gov/migratorybirds/acjv.htm , which includes focus area maps
Eastern Habitat Joint Venture	Objectives are to protect and restore wetland and upland buffer habitats in Eastern Canada.	Protection, enhancement, and evaluation components Management strategies to achieve objectives.	The six eastern-most provinces of Canada	New Brunswick Nova Scotia PEI Quebec	Reg Melanson
Mid-Atlantic/New England Maritime Regional Working Group for Waterbirds	The MANEM Working Group is a regional partnership of organizations and individuals working to facilitate waterbird conservation in Bird Conservation 14 (Atlantic Northern Forest) and 30 (New England/Mid-Atlantic Coast), and in Large Marine Ecosystem 7 (Northeast US Continental Shelf) and 8 (Scotian Shelf).	Draft species profiles with legend and sources; draft habitat profiles and waterbird site data	BCR 14 (Atlantic Northern Forest) and 30 (New England/Mid-Atlantic Coast), and in Large Marine	Maine Massachusetts New Brunswick New Hampshire New York Nova Scotia PEI Quebec	Scott Johnston, USFWS Hadley, MA 01035 413-253-8557 Scott_Johnston@fws.gov Or

	The working group hopes to help local resource managers within the region protect waterbirds and their habitats by facilitating the development and distribution of information on the status and conservation needs of waterbirds and habitats, and by building partnerships between wildlife managers, scientists, conservationists and supporters.		Ecosystems 7 (Northeast US Continental Shelf) and 8 (Scotia Shelf). Together these biologically based spatial units make up the MANEM region.	Vermont	Kathy Parsons Manomment Center for Conservation Parsonk@manomet.org For Species Profiles: http://birds.fws.gov/regionalplanning/internal/MANEM/
TNC Northern Appalachian Forest Ecoregion Plan	Ecoregional plans identify targets -- the species, communities and ecosystems that represent an ecoregion's natural diversity. For each target, scientists determine how much is enough based on rarity and distribution; teams then use GIS programs to map and display distributions of targets. With the help of local experts and computer models, planning teams determine where to direct conservation efforts to achieve stated goals.	Portfolio of prioritized sites for conserving ecoregional targets Habitat objectives (amount and configuration) for supporting long-term survival of regional populations of target species	BCR 14	Maine Massachusetts New Brunswick New Hampshire New York Nova Scotia PEI Quebec Vermont	
<i>Species-Specific Conservation Plans</i>					
America Woodcock Management Plan, 1990 Prepared by USFWS	The purpose of this Plan is to guide the conservation of woodcock in the United States. It describes ways in which the USFWS, state conservation agencies, other public agencies, and private organizations can work cooperatively in addressing problems, developing management programs, and otherwise assuring the future well-being of woodcock.	Population and habitat objectives, recommendations, strategies to implement plan.	Eastern and Central regions	Maine Massachusetts New York New Jersey Vermont	Contact individual state game managers for guidance.
A Landowner's Guide to Woodcock Management in the Northeast Prepared by USFWS and University of Maine	This guide covers the biology of the woodcock, its habitat requirements, and management techniques used to improve woodcock habitat. Actual management situations are stressed.	Habitat requirements and management recommendations	Northeastern US	Maine New Hampshire Vermont New York Massachusetts	http://www.umaine.edu/mafes/electpubs/miscrepts/newoodcock.pdf
Tern Management Handbook, Coastal Northeastern United States and Atlantic Canada June 2002 Partners	This handbook provides historic background, a review of factors limiting populations, biology and techniques for managing and monitoring the tern species nesting from Long Island, New York to Newfoundland and the north shore of the Gulf of St. Lawrence. The handbook also identifies	History of populations, biology, limiting factors, management techniques, monitoring techniques, and research needs.	Newfoundland to Long Island	Connecticut Maine Massachusetts New Hampshire New York Rhode Island	Kress, S.W. and C.S. Hall. 2002. Tern Management Handbook: Coastal Northeastern

USFWS, Canadian Wildlife Service, National Audubon Society	research needs and includes maps showing the location of tern populations within the United States. The handbook focuses on coastal populations of Common, Arctic, Roseate and Least Terns. It also provides information about less common southern species, including Forster's and Gull-billed Terns, Black Skimmers that edge into the southern boundaries of the region, and Caspian Terns which nest in Newfoundland.	Tables include: - Population estimates - Criteria for selecting restoration sites Figures include information on management and monitoring techniques Maps of tern colony locations			United States and Atlantic Canada. U.S. Fish & Wildlife Service. Hadley, MA 01035 http://northeast.fws.gov/migratorybirds/publications.htm
Piping Plover Recovery Plans – Atlantic Coast Population US Fish and Wildlife Service (1996), Piping Plover, Atlantic Coast Population, Revised Recovery Plan, USFWS, Hadley, MA. Canadian Wildlife Service (2002), National Recovery Plan for the Piping Plover. National Recovery Plan No. 22. Recovery of Nationally Endangered Wildlife. Ottawa.	These recovery plans describes recovery progress to date and delineates further actions required to recover and/or protect the Atlantic Coast population of the Piping Plover.	Population status and distribution, reasons for lists and continuing threats, recovery objectives, recovery criteria, recovery tasks, implementation schedule	Newfoundland to North Carolina	Maine New Brunswick Nova Scotia	http://ecos.fws.gov/docs/recovery_plans/1996/960502.pdf
Roseate Tern Recovery Plans US Fish and Wildlife Service (1998), Roseate Tern Recovery Plan, Northeastern Population, First Update. USFWS, Hadley, MA. <i>and</i> Lock, A.R., S. Boates, S. Cohrs, T.C. D'Eon, B. Johnson, and P. Laporte. 1993. <i>Canadian Roseate Tern recovery plan</i>. RENEW Report No. 4. Canadian Wildlife Service, Environment Canada. Ottawa.	These plans describe actions required to recover the population of Roseate Tern in northeastern North America	Population status and distribution, reasons for lists and continuing threats, recovery objectives, recovery criteria, recovery tasks	Quebec to New York	Maine Nova Scotia	
Black Duck Joint Venture Strategic Plan USFWS & CWS 1993	The BDJV is an international project designed to gather information vital to ensuring sustained populations of black ducks and other waterfowl that share their breeding range.	The Strategic Plan describes objectives and strategies for breeding ground surveys, pre-season banding, and research programs.	Atlantic and Mississippi Flyways	All jurisdictions	http://www.qc.ec.gc.ca/faune/sauvagine/html/bdjv.html and http://www.pwrc.usgs.gov/bdjv/bdjvs

					tpl.htm
Sea Duck Joint Venture Strategic Plan CWS & USFWS	The mission of the Sea Duck Joint Venture is to promote conservation of North American sea ducks by providing greater knowledge and understanding to effectively manage sea ducks.	Identifies priority information needs for sea ducks and describes implementation strategies to meet those information needs.			http://www.seaduckjv.org/index.html
Status Assessment and Conservation Plan for the Common Loon in North America By Dave Evers, Biodiversity Research Institute, for USFWS	Describes the status of the Common Loon and its conservation needs across its range using historical and current information	Includes sections on Taxonomy, Legal Status, Geographic Distribution, Biology, Population Estimates and Trends, Monitoring Activities, Habitat Requirements, Threats, Management, and Conservation Actions; also state- and province- specific overviews within the breeding range	North America	All jurisdictions	Dave Evers or Scott Johnston

Other Conservation Plans

Conservation Plan or Project description (with location)	Responsible Jurisdiction/ Organization	Species addressed	Key contacts (e-mail)	Citation, if published or available on Web, or Completion date
Plan de gestion de l'Eider à duvet nichant dans l'estuaire et le golfe du Saint-Laurent, Québec [Conservation Plan for Common Eider Breeding in the St. Lawrence Estuary and Gulf, Québec]	CWS/Duvenor	Common Eider	André Nadeau Andre.nadeau@ec.gc.ca	In progress
Plan de conservation des oiseaux aquatiques du Québec/ Conservation plan for waterbird of Québec	CWS-Quebec	Waterbird	Gilles Chapdelaine Gilles.chapdelaine@ec.gc.ca Jean-Francois Rail Jean-francois.rail@ec.gc.ca	In progress Due March 2004
Plan de conservation des oiseaux de rivage du Québec/ Conservation plan for shorebird of Québec	CWS-Quebec	Shorebird	Yves Aubry Yves.aubry@ec.gc.ca	In progress Due March 2004
Plan de conservation des oiseaux terrestres du Québec/ Conservation plan for landbird of Québec	CWS-Quebec	Landbird	Gilles Falardeau Gilles.falardeau@ec.gc.ca Jean Gauthier Jean.gauthier@ec.gc.ca	In progress Due March 2006
Plan de conservation de la sauvagine du Québec/ Conservation plan for waterfowl of Québec	CWS-Quebec	Waterfowl	Daniel Bordage Daniel.bordage@ec.gc.ca Christine Lepage Christine.lepage@ec.gc.ca	In progress Due March 2005

Maritime Canada Landbird Conservation Plan - A PIF multi-partner plan that is currently in draft form but nearing completion.	CWS-Maritimes	Landbird	Dan Busby Dan.Busby@ec.gc.ca	In progress
Shrubland Passerine Management System – MDIFW's management systems document how the Department will meet species' goals and objectives recommended by public working groups; outline how data will be collected, analyzed, and interpreted; and describe what management actions will be recommended under various scenarios.	Maine Dept. of Inland Fisheries and Wildlife (MDIFW)	Landbird	Tom Hodgman Tom.Hodgman@maine.gov	To be available at www.state.me.us/ifw
Forest Passerine Management System	MDIFW	Landbird	Tom Hodgman Tom.Hodgman@maine.gov	To be available at www.state.me.us/ifw
Wetland Passerine Management System	MDIFW	Landbird	Tom Hodgman Tom.Hodgman@maine.gov	To be available at www.state.me.us/ifw
Wild Turkey Management System	MDIFW	Wild Turkey	Brad Allen or Andy Weik Brad.Allen@maine.gov or Andy.Weik@maine.gov	To be available at www.state.me.us/ifw
Coastal Migratory Shorebird Management System	MDIFW	Migratory shorebirds	Lindsay Tudor Lindsay.Tudor@maine.gov	To be available at www.state.me.us/ifw
Ruffed Grouse Management System	MDIFW	Ruffed Grouse	Andy Weik Andy.Weik@maine.gov	To be available at www.state.me.us/ifw
American Woodcock Management System	MDIFW	American Woodcock	Andy Weik Andy.Weik@maine.gov	To be available at www.state.me.us/ifw
Common Eider Management System	MDIFW	Common Eider	Brad Allen Brad.Allen@maine.gov	To be available at www.state.me.us/ifw
Harlequin Duck Management System	MDIFW	Harlequin Duck	Brad Allen or Lindsay Tudor Brad.Allen@maine.gov or Lindsay.tudor@maine.gov	To be available at www.state.me.us/ifw
Waterfowl Management System	MDIFW	Waterfowl	Andy Weik Andy.Weik@maine.gov	To be available at www.state.me.us/ifw
Island Nesting Tern Management System	MDIFW	Common Tern, Arctic Tern, Roseate Tern,		To be available at www.state.me.us/ifw

Bald Eagle Management System	MDIFW	Bald Eagle	Charlie Todd Charles.todd@maine.gov	To be available at www.state.me.us/ifw
Piping Plover Management System	MDIFW	Piping Plover		To be available at www.state.me.us/ifw
Least Tern Management System	MDIFW	Least Tern		To be available at www.state.me.us/ifw
"Beginning With Habitat" - a habitat-based landscape approach to assessing wildlife and plant conservation needs and opportunities. The goal of the program is to maintain sufficient habitat to support all native plant and animal species currently breeding in Maine by providing each Maine town with a collection of maps and accompanying information depicting and describing various habitats of statewide and national significance found in the town.	Maine	All birds	Tom Hodgman Tom.Hodgman@maine.gov	http://www.state.me.us/dosc/nrimc/mnap/programs/BeginWithHabitat.html

Additional Resources

Priority waterfowl species by BCR--excel table

Atlantic Coast Wetland trend analysis maps – contact Andrew Milliken

PIF Rocky Mountain Bird Observatory Database (for PIF species assessment scores)-- <http://www.rmbo.org/pif/pifdb.html>

Waterfowl Mid Winter Inventory data-- <http://www.pwrc.usgs.gov/library/duckdata/>

Species-habitat models for the Gulf of Maine Watershed <http://gulfofmaine.fws.gov/gomanalysis/gomanalysis.html>

National databases-- (bird population studies, historical bird data, National Biological Information Infrastructure Bird Conservation Node Mapping Application, Population analysis software, Patuxent's Black Duck Joint Venture Projects, Waterfowl Science Projects) <http://www.pwrc.usgs.gov/birds>

Additional USFWS reports, species assessments, surveys, links to plans-- http://library.fws.gov/bird_pubsindex.htm

Grassland Bird Database--excel table-contact state Heritage program or USFWS, Randy Dettmers

Golden-winged Warbler Atlas Project (to determine population status and habitat requirements of this species across its breeding range) -- www.birds.cornell.edu/gowap/

Cerulean Warbler Atlas Project ((to determine population status and habitat requirements of this species across its breeding range) -- <http://www.birds.cornell.edu/CEWAP/>

A Landowners Guide to Woodcock Management in the Northeast - http://www.umaine.edu/mafes/elec_pubs/miscrepts/ne_woodcock.pdf

Appendix B. Amount of area (in acres) covered by 15 different land cover types in the BCR 14 portion of each province and state. Note that these numbers are derived from the land cover map that TNC compiled from remotely sensed data and may not adequately represent habitats that are not easily identified or well-sampled by remote sensing methods (e.g., early successional habitats).

Land Cover Type	Land Cover Total	Quebec	New Brunswick	Nova Scotia	Prince Edward Island	CT	Maine	MA	NH	New York	Vermont
Cloud Cover/No Data	197,026	149,916	46,873	0	0	0	217	0	9	0	11
Open Water	3,214,591	268,768	438,107	808,781	12,915	10,378	1,133,971	35,583	170,408	275,037	60,643
L/H Intensity Res.	1,166,209	134,564	262,992	343,962	26,310	9,447	181,556	58,463	63,006	19,765	66,144
High Intensity Com./Indust.	792,130	114,890	286,896	155,588	25,811	2,381	84,920	17,609	43,933	19,383	40,719
Bare rock/sand	350,781	9	9,450	300,525	5,393	428	13,093	2,500	10,575	471	8,337
Quarries/strip mines/gravel pits	93,342	7,818	40,602	27,261	3,748	228	3,410	789	3,239	3,540	2,707
Regenerating Forest	4,524,218	1,320,902	1,313,251	1,255,395	84,614	678	471,902	2,659	32,339	9,662	32,817
Deciduous forest	21,902,161	3,683,001	3,237,517	1,296,228	178,514	104,982	4,737,512	615,415	1,566,744	4,297,879	2,184,370
Evergreen forest	23,912,621	3,584,905	6,666,026	5,405,992	112,518	25,265	5,244,918	164,357	1,056,547	970,098	681,995
Mixed Forest	21,789,896	5,272,351	3,526,279	2,501,093	282,965	55,856	6,334,705	316,183	1,500,844	840,019	1,159,600
Shrubland	550,347	34,174	161,187	208,974	31,260	121	96,015	886	8,045	0	9,684
Agriculture/ Cultivated	5,707,858	1,531,530	756,699	558,949	559,153	30,087	941,960	104,041	260,227	353,392	611,820
Forested wetland	2,444,393	18,704	664,513	315,768	53,477	18,322	728,449	69,011	122,769	374,062	79,318
Emergent herbaceous wetland	1,617,448	1,296	620,593	616,287	20,927	5,422	189,469	11,801	66,818	26,692	58,143
Jurisdictional total	88,263,022	16,122,829	18,030,985	13,794,803	1,397,605	263,594	20,162,098	1,399,298	4,905,503	7,190,001	4,996,307

Appendix C, Part 1. Specific methods used by taxonomic groups to apply the general BCR 14 rules and criteria for identifying priority species.

- Go to [process used for shorebirds](#)
- Go to [process used for waterbirds](#)
- Note that the process used for waterfowl has not been documented – contact [Keith McAloney](#) or [Brad Allen](#) for more information.

Process used to identify priority landbirds

DEFINITIONS

PT = Partners in Flight “population trend” score

TB = Partners in Flight “threats to breeding” score

TN = Partners in Flight “threats to non-breeding” score

AI = Partners in Flight “area importance” score

% pop = percent of breeding population in BCR 14

High Continental Concern = a Partners in Flight continental level Watch List species

High BCR Concern = local PT ≥ 3 and (local TB ≥ 3 or local TN ≥ 3)

BCR Declines = local PT ≥ 4

High BCR Threats = local TB ≥ 4 or local TN ≥ 4

Moderate BCR Threat = local TB ≥ 3 or local TN ≥ 3

High BCR Responsibility = % pop $\geq 8\%$ or AI = 5

Moderate-High BCR Responsibility = % pop $\geq 4\%$ or AI ≥ 4

Moderate BCR Responsibility = % pop $\geq 1\%$ or AI ≥ 3

Highest Priority Landbirds

- **Rule 1:** High BCR Concern AND High BCR Responsibility AND High Continental Concern

Bicknell's Thrush

Nelson's Sharp-tailed Sparrow

Wood Thrush

Canada Warbler

Bay-breasted Warbler

Ipswich Savannah Sparrow

American Woodcock

High Priority Landbirds

- **Rule 2:** High Continental Concern AND Moderate BCR Responsibility

Olive-sided Flycatcher
Rusty Blackbird
Blue-winged Warbler

- **Rule 3:** Moderate-High BCR Responsibility (%pop $\geq$ 4 or AI $\geq$ 4) AND BCR Declines AND Moderate BCR Threat

Cape May Warbler
Chestnut-sided Warbler
Bobolink
Veery
Eastern Wood-Pewee

- **Rule 4:** High BCR Responsibility (%pop $\geq$ 8%) AND BCR Declines

Purple Finch
Yellow-bellied Sapsucker
American Redstart

- **Added For Other Reasons**

Boreal Chickadee (permanent resident with highest overall score)
Common Nighthawk (all Canadian jurisdictions concerned about steady declines)
Long-eared Owl (all Canadian jurisdictions concerned about declines, threats to habitat, and lack of information)
Black-throated Blue Warbler (high BCR responsibility and high overall score)
Chimney Swift (BCR decline, moderate BCR responsibility, all Canadian jurisdictions highly concerned about dwindling populations and threats from lack of nest sites)

Moderate Priority Landbirds

- **Rule 5:** Moderate-High BCR Priority AND BCR Decline AND Total Score $\geq$ 19

Ruffed Grouse
Rose-breasted Grosbeak

(*Note – the following species meet the first two criteria of this rule, but have Total Score < 19:
Belted Kingfisher, Least Flycatcher, White-throated Sparrow, Ruby-crowned Kinglet, Tree Swallow, Barn Swallow, Bank Swallow, Gray Catbird, Eastern Kingbird, Swainson's Thrush,

Common Snipe, Killdeer, Song Sparrow, American Robin, Dark-eyed Junco, Red-winged Blackbird.)

- **Rule 6:** Moderate BCR Responsibility AND BCR Decline AND Moderate BCR Threat

Blackpoll Warbler
Black-billed Cuckoo

- **Rule 7:** High BCR Responsibility AND Moderate BCR Threat AND Total Score ≥ 18

Northern Parula
Blackburnian Warbler
Black-throated Green Warbler
Ovenbird

- **Rule 8:** Moderate BCR Responsibility AND Uncertain BCR Trend (local PT = 3) AND Moderate BCR Threat

Yellow-bellied Flycatcher
Northern Goshawk
Bald Eagle
Brown Creeper

(*Note – there is a group of species that would meet Rule 4 *except* they have stable or increasing BCR trends (local PT ≤ 2). As a whole, this group does not warrant inclusion on the Moderate Priority list, although one or more individual species from this group could be considered for other reasons: Mourning Warbler, Philadelphia Vireo, Great Crested Flycatcher, Northern Harrier, American Kestrel, Osprey, White-winged Crossbill, Wild Turkey)

- **Rule 9:** High BCR Threat (local TB ≥ 4 or local TN ≥ 4) AND poorly surveyed by BBS

Whip-poor-will
Short-eared Owl

- **Added for Other Reasons**

Gray Jay (Canadians have information suggesting population declines and high threats)
Vesper Sparrow (significant population decline, high breeding threats, responsibility for eastern subspecies)
Horned Lark (significant range-wide and BCR decline, high breeding threats, different grassland habitat needs than other grassland birds – bare ground)
Palm Warbler (represents bog habitat in southern Quebec, which are under high threat)

Pine Grosbeak (significant BCR decline, unknown threats from forest management, high Canadian responsibility)
 Northern Flicker (range-wide declines, moderate BCR responsibility, creates cavities used by many other cavity species, highlights need to retain snags)
 Northern Harrier (range-wide declines, moderate BCR responsibility, moderate BCR threats)
 Upland Sandpiper (high BCR threats, Total Score = 20)
 Boreal Owl (lack of knowledge and information about the species, snag issue)
 Black-backed Woodpecker (representative of need for fire and snags in conifer forests)
 Peregrine Falcon (recently federally de-listed in U.S., still a species of concern in most jurisdictions)
 Barn Swallow (BCR decline and moderate-high BCR responsibility)
 Bank Swallow (BCR decline and moderate-high BCR responsibility)

Process used to identify priority shorebirds

Shorebird Conservation Priorities for BCR-14 - the Atlantic Northern Forest

1. Introduction

This section summarizes the shorebird conservation priorities for BCR-14, the Atlantic Northern Forest, as part of the development of all-bird priorities for the region. It is based largely on the decisions reached by consensus at the Rockland, Maine BCR-14 Workshop (3-5 December 2002), but reflects input from several earlier workshops, most notably that held in Charlottetown, P.E.I. by a broad representative group of Canadian experts (29-30 October 2002).

In addition to the expertise of those attending the workshops, these priorities also reflect information contained in the Atlantic, Quebec, Canadian, US and US Northern Atlantic shorebird conservation plans.

2. Priority Species

BCR-14 is a particularly important region as a stop-over area for millions of migrating shorebirds, and is also important for several breeding shorebirds and for one over-wintering species (Table 1). As a consequence, most of the species identified as being of regional conservation priority were migrants, although several are either breeding or over-wintering species.

Table 1. Number of shorebird species regularly occurring in BCR-14

Season	Number of Species				
	Highest Priority	High Priority	Medium Priority	Low Priority	Total
Breeding	1	2	4	1	8/11
Over-wintering	1	-	-	-	1/1
Migrating (spring and/or fall)	2	7	4	6	13/22
Total	4	9	8	7	28

In a clear reflection of current continental concern for shorebird populations in general, and the importance of this region to migrating shorebirds, 21 of the 28 species that regularly occur in BCR-14 were considered to be of regional conservation concern.

Three categories were used to identify priority species - *Highest, High and Medium* - based on the approach agreed upon at the Rockland workshop, and modified slightly to capture all possibilities (Table 2). This approach ensured that decisions on assignment to categories were based on objective criteria. However, additional subjective expert opinion was occasionally used to resolve situations where information was lacking, or where data from different parts of the BCR suggested quite different levels of abundance or concern.

Table 2. Conservation priority categories for shorebird species within BCR-14

Priority	Criteria/Rule
HIGHEST	a. High BCR Concern <i>and</i> High BCR Responsibility <i>and</i> High or Continental Concern <i>or</i> b. High BCR Concern <i>and</i> High BCR Responsibility <i>and</i> Moderate Continental Concern
HIGH	c. Moderate BCR Concern and High BCR Responsibility <i>or</i> d. High Continental Concern and Moderate BCR Responsibility
MEDIUM	e. Moderate BCR Concern and Moderate BCR responsibility <i>or</i> f. High Continental Concern and Low BCR Responsibility

We considered species in which at least 15% of the continental population occurred in BCR-14 at some time during the year to be of *High BCR responsibility*, and those with about 5-15% of the continental population to be of *Medium BCR responsibility*. There was no ranking assigned within the group of species in each category, and all are simply considered as members of priority pools.

Levels of very high, high, moderate or low were assigned for each species for categories of Continental Concern (using the list found in the Canadian and US Shorebird Conservation Plans), BCR-14 Concern (using the levels from the US Northern Atlantic, Quebec, and Atlantic Canada Conservation Plans) and BCR-14 Responsibility (using the US Northern Atlantic and Atlantic Canada Conservation Plans). The resulting BCR-14 priority level was then determined using the criteria/rules in Table 2, although some species were moved one level up or down based on the expert opinion of contributing shorebird scientists and managers (Table 3).

Table 3. Information used to assign shorebirds to priority pools within BCR-14

Species (Main Season Present) Source of information and ranking rule	Continental Concern		BCR-14 Concern				BCR-14 Responsibility			Recommended BCR-14 Priority	
	Rule 1.	Level 1.	US 2.	Mar 3.	Que 4.	BCR	US 5.	Can. 6.	BCR	Level	Rule
HIGHEST											
Piping Plover (B)	5a	V. High	5	H	H	High	3	-	Mod.	HIGHEST	a
Semipalmated Sandpiper (M)	3a	Mod.	4	H	M	High	5	70%	High	HIGHEST	b
Purple Sandpiper (W)	2b	Low	4	M	H	High	5	90%	High	HIGHEST	b*
Red-necked Phalarope (M)	3a	Mod.	4	H	M	High	5	70%	High	HIGHEST	b

HIGH											
Black-bellied Plover (M)	3a	Mod.	3	M	M	Mod.	4	50%	High	HIGH	c
American Golden-Plover (M)	4a,b	High	-	M	M	Mod.	-	70%	High	HIGH	c
Upland Sandpiper (B)	2b	Low	4	L	M	Mod.	3	<1%	Low	LOW	-
Whimbrel (M)	4a	High	4	M	M	Mod.	3	30%	High	HIGH	c
Ruddy Turnstone (M)	4a,b	High	4	L	M	Mod.	4	50%	High	HIGH	c
Red Knot (M)	4a	High	4	L	M	Mod.	3	20%	High	HIGH	c
Short-billed Dowitcher (M)	3a	Mod.	3	M	M	Mod.	3	50%	High	HIGH	c
American Woodcock (B)	4a	High	4	M	M	Mod.	5	35%	High	HIGH	c
Red Phalarope (M)	3a	Mod.	3	H	M	Mod.	4	60%	High	HIGH	c
MEDIUM											
Hudsonian Godwit (M)	4b	High	4	L	M	Mod.	3	30%	High	HIGH	c,d
Semipalmated Plover (M)	2a	Low	2	L	M	Low	4	60%	High	LOW	-
Killdeer (B)	3a	Mod.	3	L	M	Low	3	10%	Med.	LOW	-
American Oystercatcher (B)	4b	High	4	L	-	Mod.	3	-	Low	MEDIUM	f
Willet (B)	3c	Mod.	3	M	L	Mod.	3	20%	High	HIGH	c
Sanderling (M)	4a	High	4	L	M	Mod.	3	40%	High	HIGH	c,d
Least Sandpiper (M)	3e	Mod.	3	M	M	Mod.	4	40%	High	HIGH	c
Wilson's Snipe (B)	4a	High	3	M	H	Mod.	4	20%	High	HIGH	c,d
LOW											
Greater Yellowlegs (M)	3b	Mod.	3	L	L	Low	4	15%	Med.	LOW	-
Lesser Yellowlegs (M)	2a	Low	2	L	M	Low	4	15%	Med.	LOW	-
Solitary Sandpiper (M)	3b	Mod.	3	L	H	Low	4	15%	Med.	LOW	-
Spotted Sandpiper (B)	3b	Mod.	2	L	M	Low	4	30%	High	LOW	-
White-rumped Sandpiper (M)	2a	Low	2	L	L	Low	3	50%	High	LOW	-
Pectoral Sandpiper (M)	2a	Low	-	L	L	Low	-	10%	Low	LOW	-
Dunlin (M)	3a	Mod.	3	L	M	Low	3	20%	High	LOW	-

Sources

1. Canadian Shorebird Conservation Plan 2000. Appendix 4. Columns 7 and 8, and US Shorebird Conservation Plan 2001. Appendix 3
2. US North Atlantic Summary, column 6 (BCR-14 priority)
3. Atlantic Shorebird Conservation Plan (Draft May 2002). Table 2 column 3 (Conservation priority)
4. Quebec Shorebird Conservation Plan 2002.
5. US North Atlantic Summary, column 5 (AI score)
6. Atlantic Shorebird Conservation Plan (Draft May 2002). Table 2 column 2 (estimated % of Canadian total)

3. Geographic Approaches and Habitat Concerns

As most shorebirds are restricted to fairly typical habitats at most times of the year, it was relatively easy to identify the types of habitats used by each species when present in BCR-14, using the standard list provided at the workshop. These habitat types are listed in approximate decreasing order of importance for each species in Table 4.

Initial habitat and related conservation objectives were determined for each species, based on the consensus of the workshop participants and information from other sources available to them (Table 4). These objectives relate to specific habitat protection and stewardship activities needed within BCR-14, to ensure that sufficient high-quality habitat is available to meet the needs of each species while it is present in the breeding season, during the wintering period, or on migration.

Initial science and conservation action, in terms of the specific needs for research, monitoring and outreach were then identified for each species (Table 4). These science and outreach needs are generally needed within BCR-14 to provide sufficient information to effectively conserve the birds and their habitats here, and to enlist the of other partners and the public in doing so.

Table 4a. Important habitat types used by highest priority shorebird species in BCR-14, with their habitat and conservation objectives, and research, monitoring and outreach needs.

Species	Habitat Types (decreasing order of importance)	Habitat and Conservation Objectives	Research, Monitoring, Outreach Needs
Piping Plover (B)	10. Sand flats, sand and gravel beaches 11. Mudflats	• reduce disturbance on breeding beaches	• implement recovery plans
Semipalmated Sandpiper (M)	11. Mudflats 10. Sand flats, sand and gravel beaches 12. Rocky coastline	• reduce disturbance at staging sites (roosts, mudflats), • reduce predator disturbance, • protect key staging sites	• monitor inter-tidal infauna, • monitor to improve population estimates, • assess turnover
Purple Sandpiper (W)	12. Rocky coastline	• manage coastal harvests (rockweed, periwinkles), • manage oil spills	• assess impacts of coastal harvests, • conduct winter surveys, • develop population estimates
Red-necked Phalarope (M)	3. Nearshore marine areas 2. Estuaries - open water 4. Offshore marine areas	• identify key staging areas • protect present and former stop-over sites	• investigate movements/declines

Table 4b. Important habitat types used by high priority shorebird species in BCR-14, with their habitat and conservation objectives, and research, monitoring and outreach needs.

Species	Habitat Types (decreasing order of importance)	Habitat and Conservation Objectives	Research, Monitoring, Outreach Needs
Black-bellied Plover (M)	11. Mudflats 10. Sand flats, sand and gravel beaches 18. Agricultural fields and grasslands	• reduce disturbance at staging sites (roosts, mudflats), • manage baitworm harvesting, • protect key staging sites	• improve population estimates, • assess turnover (monitor)
American Golden-Plover (M)	18. Agricultural fields and upland heath 6. Maritime saltmarsh 17. Blueberry barrens	• protect key staging sites	• locate and monitor migration staging areas
Upland Sandpiper (B)	18. Agricultural fields 17. Early successional stages	• maintain and manage nesting habitat	• annual monitoring
Whimbrel (M)	11. Mudflats 17. Blueberry barrens	• protect key staging sites	• locate and monitor migration staging areas
Ruddy Turnstone (M)	10. Sand flats, sand and gravel beaches 12. Rocky coastline	• protect key staging sites	• locate and monitor migration staging areas
Red Knot (M)	11. Mudflats, 10. Sand flats, sand and gravel beaches	• protect key staging sites	• locate and monitor migration staging areas

Short-billed Dowitcher (M)	11. Mudflats 6. Maritime saltmarsh 10. Sand flats, sand and gravel beaches	protect key staging sites	locate and monitor migration staging areas
American Woodcock (B)	17. Early successional stages 18. Agricultural fields and grasslands 8. Scrub shrub wetland	- improve habitat, - implement task force recommendations	continue to monitor populations
Red Phalarope (M)	3. Nearshore marine areas 2. Estuaries - open water 4. Offshore marine areas	- identify key staging areas - protect present and former stop-over sites	investigate movements/declines

Table 4c. Important habitat types used by medium priority shorebird species in BCR-14, with their habitat and conservation objectives, and research, monitoring and outreach needs.

Species	Habitat Types (decreasing order of importance)	Habitat and Conservation Objectives	Research, Monitoring, Outreach Needs
Hudsonian Godwit (M)	11. Mudflats 6. Maritime saltmarsh 10. Sand flats, sand and gravel beaches	protect key staging sites	locate and monitor migration staging areas
Semipalmated Plover (M)	11. Mudflats 10. Sand flats, sand and gravel beaches	protect key staging sites	locate and monitor migration staging areas
Killdeer (B)	18. Agricultural fields and grasslands 19. Agricultural fields 20. Urban and suburban grasslands 10. Sand flats, sand and gravel beaches		investigate declines
American Oystercatcher (B)	10. Gravel beaches 11. Mudflats	manage disturbance of breeding sites	monitor breeding numbers
Willet (B)	6. Maritime saltmarsh coastal 18. Coastal grasslands 11. Mudflats	secure nesting saltmarsh habitat	monitor breeding numbers
Sanderling (M)	10. Sand flats, sand and gravel beaches	protect key staging sites	locate and monitor migration staging areas
Least Sandpiper (M)	11. Mudflats 10. Sand flats, sand and gravel beaches 6. Maritime saltmarsh 7. Freshwater marsh	protect key staging sites	locate and monitor migration staging areas
Wilson's Snipe (B)	7. Freshwater marsh 18. Coastal grasslands, agricultural grasslands	prevent loss of nesting and staging habitat	improve harvest surveys

4. Participants

The same group of shorebird biologists and managers attended most of the Rockland break-out sessions, and separate lists were not kept of those present at each. The following people attended at least one, and in most cases all, of the shorebird sessions:

Yves Aubry	Canadian Wildlife Service, Québec Region
Stephen Brown	Manomet Center for Conservation Sciences
Bruce Connery	Acadia National Park, Maine
Charles Duncan	The Nature Conservancy, Migratory Bird Program, Maine
Richard Elliot	Canadian Wildlife Service, Atlantic Region
Raymond Sarrazin	Canadian Wildlife Service, Québec Region
Ellen Snyder	University of New Hampshire Cooperative Extension
Lindsay Tudor	Maine Department of Inland Fisheries and Wildlife

In addition to those actually present at the Rockland workshop, several additional shorebird biologists who made significant contributions through earlier meetings are worthy of mention here, including:

Sherman Boates	Nova Scotia Department of Natural Resources
Rosemary Curley	Prince Edward Island Fish and Wildlife Branch
Brian Harrington	Manomet Center for Conservation Sciences
Peter Hicklin	Canadian Wildlife Service, Atlantic Region

Process for indentifying priority waterbirds

The following table was used to determine priority categories for waterbird species:

Original	Species	BCR responsibility	BCR concern	NAWCP Concern	BCR14 new rank	Notes
A	Great Cormorant	High	High	Moderate	Highest	
B	Greater Shearwater	High	Moderate	High	Highest	
A	Northern Gannet	High	High	Low	High	
A	Common Tern	High	High	Low	High	
A	Roseate Tern	Moderate	High	High	High	
B	Red-necked Grebe	High	Moderate	Not at risk	High	
B	Arctic Tern	Moderate?	High	High	High	
B	Razorbill	High	Moderate	Moderate	High	
B	Black Guillemot	High	Moderate	Not at risk	High	
C	Black-crowned Night Heron	Moderate	High	Moderate	High	
-	Herring Gull	High	Moderate	Low	High	
B	Common Loon	Low	High	Moderate	Moderate	
B	Red-throated Loon	Low?	High?	High	Moderate	
B	Horned Grebe	Low?	High?	High	Moderate	
B	Leach's Storm-petrel	Low	High	Low	Moderate	
B	American Bittern	Low	High?	High	Moderate	
C	Yellow Rail	Low	Moderate	High	Moderate	
C	Black-legged Kittiwake	Low	Moderate	Not at risk	Moderate	
C	Atlantic Puffin	Low	Moderate	Not at risk	Moderate	Listed as Endangered in Maine
C	Least Bittern	Low	Moderate	Moderate		
C	Black Tern	Low	Moderate	Moderate		
C	Pied-billed Grebe	?	Low	Not at risk		Listed as Endangered in some states
C	Virginia Rail	?	Low	Not at risk		
C	Sora	?	Low	Low		

Appendix C, Part 2. Priority species data sheets, providing information on population status, research and monitoring needs, and conservation objectives.

See [Table 2](#) in the main text of the Blueprint for a complete list of the BCR 14 priority species.

- [Jump to priority waterbird species data sheets](#)
- [Jump to priority waterfowl species data sheets](#)

Landbird Priority Species Data Sheets

Species	Bicknell's Thrush
Status	BCR 14 Highest Priority; PIF Continental Watch List; Special Concern in Canada, VT, ME, NY, NH; Uncertain population trend in BCR 14.
Importance and role of BCR-14	≥ 90% of breeding population in BCR 14
Conservation issues and threats in BCR-14	Atmospheric deposition, methylmercury toxicity, global climate change, communications towers, ski area development, wind power development, winter habitat loss, industrial forestry in northern portion of its range
Population objectives	Increase population stability and numbers by 10% (PIF), no contraction of breeding range, habitat restoration and buffer zone creation on wintering grounds
Monitoring needs	Expand current monitoring scheme for high elevation species, fully analyze existing data to determine population changes, expand monitoring of wintering populations, continue and/or expand demographic monitoring, evaluate significance of contaminant exposure (e.g., mercury).
Research needs	Natal dispersal and migratory connectivity, climate change modeling, reproductive success and demographics in industrial forest landscapes, sexual habitat segregation in winter, distribution and habitat use in Cuba, Haiti, & Jamaica, methylmercury toxicity, population viability analysis
Outreach needs	Use BITH as umbrella species to educate North Americans and Dominicans about migratory connectivity and international conservation, educate recreational users of montane forests about BITH conservation
Habitat conservation objectives	Secure protection for core population areas in Maritimes and Maine, secure stewardship and management agreements with forest industry in Canada, develop management plans and formal protection measures for core wintering areas, develop mitigation policies and measures to offset development projects in the U.S. (e.g., donate dollars for wintering ground protections), habitat restoration and creation of buffer zones around important habitat in wintering grounds.
Focus area/site conservation objectives	Industrial forest regeneration patches in Maine and Maritimes, all unprotected areas in breeding range, Sierra de Bahoruco, Sierra de Neiba, Los Haitises and other areas in Dominican Republic and Sierra Maestra in Cuba

Species	Canada Warbler
Status	BCR 14 Highest Priority; PIF Continental Watch List; no legal status; negative BBS population trend for BCR 14 (-2.46%/yr, $P < 0.001$ for 1966-1999 in BCR 14)
Importance and role of BCR-14	14% of breeding population in BCR 14; relatively high breeding densities in northern portions on this BCR
Conservation issues and threats in BCR-14	Winter ground habitat loss, forest management (reduced vegetation structure, esp. understory)
Population objectives	Reverse population decline and increase BCR 14 population by 50% (PIF)
Monitoring needs	Expanded network of interior forest monitoring sites, addition of managed forest monitoring sites including regenerating forest sites
Research needs	Basic demographics, wintering habitat utilization and distribution, forest management prescriptions, relative importance of breeding habitats
Outreach needs	Outreach on wintering grounds, work with local communities on wintering grounds to educate them about CAWA conservation issues.
Habitat conservation objectives	Stop loss of wintering habitat and improve breeding habitat quality to support increase in population
Focus area/site conservation objectives	?

Species	Wood Thrush
Status	BCR 14 Highest Priority; PIF Continental Watch List; no legal status, declining BBS trend (-2.49%/yr, $P < 0.001$ for 1966-1999 in BCR 14)
Importance and role of BCR-14	9.1% of breeding population in BCR 14; relatively high breeding densities in southern portion on this BCR
Conservation issues and threats in BCR-14	Declining populations but not clear why, possible issues with habitat quality and loss of shrub/sub-canopy layers from forests, acid rain or other pollutants, and wintering habitat loss
Population objectives	Increase populations to adjust for long-term declines
Monitoring needs	Continue monitoring through BBS
Research needs	Demographic investigations into population declines, especially reproductive success in relation to forest condition, landscape context, and atmospheric deposition; develop forest management guidelines
Outreach needs	Communicate appropriate management techniques to forest managers
Habitat conservation objectives	Improve habitat quality to support increase in population
Focus area/site conservation objectives	Develop regional integrated forest management plan Develop forest management guidelines which would result in improving habitat quality and quantity.

Species	Bay-breasted Warbler
Status	BCR 14 Highest Priority; PIF Continental Watch List; no legal status; possibly declining BBS trend (-1.79%/yr, P=0.27 for 1966-1999 in BCR 14)
Importance and role of BCR-14	9.3% of breeding population in BCR 14, mostly in Canadian portion; this BCR represents the southern edge of its breeding range; relatively high breeding densities in northern portion of this BCR
Conservation issues and threats in BCR-14	Loss of mature spruce-fir habitat due to short rotation harvest and forest conversion, spraying for budworm, forest fragmentation, wintering ground habitat loss, perhaps global climate change in the longterm
Population objectives	Populations are naturally cyclical with budworm outbreaks, making it difficult to make a population target, however, attempt to increase it by 50%
Monitoring needs	Wintering population concerns, and BBS may not adequately monitor the more northern portion of the breeding population (north of this BCR)
Research needs	Investigate effects of spruce budworm and impacts of related activities to control budworm And determine if current population level reflects natural population fluctuations associated with budworm outbreaks; investigate wintering ground concerns
Outreach needs	
Habitat conservation objectives	Maintain existing large areas of mature spruce-fir forest
Focus area/site conservation objectives	Southeast Canada (this is the area of highest responsibility)

Species	Neslon's Sharp-tailed Sparrow
Status	BCR 14 Highest Priority; PIF Continental Watch List; no legal status, stable or possibly increasing BBS trend (+1.98%/yr, P=0.60 for 1966-1999 in BCR 14)
Importance and role of BCR-14	>90% of eastern subspecies breeds in BCR 14
Conservation issues and threats in BCR-14	Reduce threats from: saltmarsh loss and degradation, sea level rise, oil spills and pollution from industrial discharge and contaminants (mercury)
Population objectives	Maintain stable population in the BCR
Monitoring needs	This species is poorly covered by BBS – need special monitoring effort targeted at this and other saltmarsh species – inventory of New England saltmarshes has been accomplished but need a long term monitoring program Evaluate need to restore tidal flow to “historic” marsh habitat (i.e. remove tide gates and install longer culverts)
Research needs	Study demographics, especially factors affecting reproductive success; study winter habitat use and distribution; better understanding of the taxonomic status with the interior subspecies; develop a better population estimate; determine effects of saltmarsh restoration efforts on species and continue contaminant investigations to evaluate significance to population.
Outreach needs	
Habitat conservation objectives	Protect existing breeding sites and surrounding upland habitat at all occupied sites.
Focus area/site conservation objectives	

Species	Ipswich Savannah Sparrow
Status	BCR 14 Highest Priority; Special Concern in Canada
Importance and role of BCR-14	100% of the breeding population of this subspecies and most of its wintering grounds occur in BCR 14
Conservation issues and threats in BCR-14	Continued protection of Sable Island breeding grounds; sea level rise; coastal development in wintering areas along the East Coast
Population objectives	Return to levels from 70s/80s as measured by McLaren & Stobel
Monitoring needs	Surveys of breeding grounds and improved discrimination from other Savannah Sparrows on Christmas Bird Counts
Research needs	Taxonomic status needs more work; specific winter microhabitats need better definition Initiate surveys of occupied winter range to identify and evaluate site characteristics.
Outreach needs	Inform coastal beachfront landowners about the species' winter habitat needs
Habitat conservation objectives	Needs to be informed by results from winter habitat studies
Focus area/site conservation objectives	Sable Island, NS and coastal beach areas of New England south to the Carolinas

Species	American Woodcock
Status	BCR 14 Highest Priority; hunted species; declining BBS trend (-6.37%/yr, P=0.01 for 1966-1999 in BCR 14)
Importance and role of BCR-14	19.3% of the breeding population in BCR 14 = high responsibility Estimate population of 523,000 in Maine, between 1968-2001, Maine populations declined 2.2%/year.
Conservation issues and threats in BCR-14	Forest maturation; declining even-age forest management; urbanization and other human development; pesticides/contaminants?, loss and degradation of wintering, breeding, and migrating habitat, loss and alteration of forested wetlands, adult mortality rates (predation, weather and harvest)
Population objectives	Stop decline by 2012 and see increases by 2022 to populations of 1970s as measured by singing ground surveys
Monitoring needs	Singing ground surveys are in place but need assessment for continued accuracy; monitor recruitment via harvest surveys Evaluate effects of contaminant exposure
Research needs	Singing ground survey evaluation; study productivity/recruitment; investigate threats from pesticides and other contaminants
Outreach needs	Technical assistance to private landowners (industrial and non-industrial); public forest land management planning
Habitat conservation objectives	Both forest management (i.e. clear-cutting, heavy partial cuts, fuel wood harvests) and the increasing harvest of early successional hardwoods may enhance habitat for woodcocks. Cuts should be planned to take advantage of moisture gradients and log landings, and semi-permanent openings should be scattered to serve as singing grounds.
Focus area/site conservation objectives	

Species	Purple Finch
Status	BCR 14 High Priority; no legal status; declining BBS trend in BCR 14 (-2.43%/yr, $P < 0.001$ for 1966-1999 in BCR 14)
Importance and role of BCR-14	11.4% of breeding population in BCR 14; relatively high breeding densities throughout much of this BCR
Conservation issues and threats in BCR-14	Declining population in BCR, unknown but possible threat from changes in forest structure, wintering habitat loss??
Population objectives	Reverse population decline
Monitoring needs	Continue monitoring population trends, addition of managed forest monitoring sites
Research needs	Need better information on habitat associations, including forest structure; determine causes of decline
Outreach needs	Communicate needs for greater diversity in vegetation structure to forest managers
Habitat conservation objectives	provide more suitable breeding habitat through management practices that produce greater diversity of vegetation structure
Focus area/site conservation objectives	

Species	Yellow-bellied Sapsucker
Status	BCR 14 High Priority; no legal status; declining BBS trend (-1.64% /yr, P=0.02 for 1966-1999 in BCR 14)
Importance and role of BCR-14	11.5% of breeding population in BCR 14; relatively high breeding densities throughout much of this BCR
Conservation issues and threats in BCR-14	Loss of nesting trees/cavities
Population objectives	Reverse population decline
Monitoring needs	
Research needs	Little is known about sapsucker physiology, behavior and ecology after breeding season. Investigate cause of declines
Outreach needs	
Habitat conservation objectives	Increase quality habitat, leave suitable cavity trees for nesting habitat after timber harvest
Focus area/site conservation objectives	

Species	Rose-breasted Grosbeak
Status	BCR 14 Moderate Priority; no legal status; possible BBS decline (-0.81%/yr, P=0.15 for 1966-1999 in BCR 14)
Importance and role of BCR-14	Moderate importance – large regional breeding population (7.7%) and possible declining population; relatively high breeding densities throughout this BCR
Conservation issues and threats in BCR-14	Not well known, possibly declining due to maturing forest leading to a loss of mid-story vegetation structure or possibly tied to declining hardwood tree species
Population objectives	Stabilize and reverse population declines
Monitoring needs	Pretty well monitored
Research needs	Determine causes of declines, investigate their response to forestry practices, identify management that could be beneficial
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Black-billed Cuckoo
Status	BCR 14 Moderate Priority; no legal status; populations tend to be cyclic – stable continentally but decreasing in BCR (-4.37%/yr, $P < 0.001$ for 1966-1999 in BCR 14)
Importance and role of BCR-14	Moderate importance for breeding – 2.2% of breeding population in BCR 14; relatively low breeding densities throughout this BCR
Conservation issues and threats in BCR-14	Not well known, possibly loss of appropriate shrub layer from forests as well as loss of hedgerows and roadside shrubs, likely highly susceptible to pesticides
Population objectives	Reverse decline, double current population
Monitoring needs	Adequately monitored by BBS, but need a better population estimate
Research needs	Habitat requirements, limiting factors, causes of decline, study possible effects of pesticides on this species and its prey
Outreach needs	
Habitat conservation objectives	Unknown if breeding habitat is limiting factor, conservation of hedgerows and shrublands
Focus area/site conservation objectives	Shrubland zones

Species	Blackpoll Warbler
Status	BCR 14 Moderate Priority; Special Concern in MA; declining BBS population (-7.36%/yr, P=0.01 for 1966-1999 in BCR 14)
Importance and role of BCR-14	High densities in high elevations of U.S. portions of BCR – higher than in most of the rest of its range despite small proportion of whole range in BCR 14; also present in coastal Maine and Maritimes
Conservation issues and threats in BCR-14	Mountaintop development, atmospheric deposition, global climate change, stopover habitat in northeastern coastal plain
Population objectives	Stabilize population or increase if population is declining
Monitoring needs	Expand existing high elevation surveys
Research needs	Detailed demographic breeding studies in an attempt to elucidate which factors might influence population change relative to proposed threats and magnitude of population trends, evaluate potential impacts of migration habitat degradation
Outreach needs	Use trans-oceanic migration as a means to increase awareness of conservation issues, educate recreational users of montane forests about Blackpoll biology and conservation
Habitat conservation objectives	Maintain existing acreages of habitat
Focus area/site conservation objectives	

Species	Olive-sided Flycatcher
Status	BCR 14 High Priority; Continental Watch List; Special Concern in Maine, declining BBS population (-3.65%/yr, P=0.006 for 1966-1999 in BCR 14)
Importance and role of BCR-14	Small but manageable population of a species this is of high continental concern, AI score should possibly be a 3, steeply declining population rangewide, represents bog and spruce-fir habitats
Conservation issues and threats in BCR-14	Not well known, should respond positively to disturbance and forestry but there could be ecological traps due to high predation rates at artificial edges, major threats could be habitat loss on S. American wintering grounds
Population objectives	Stabilize and reverse population declines, restore to pre-BBS levels, strive to double current populations
Monitoring needs	Needs targeted monitoring such as species-atlas project, especially in bog habitats, should strive to confirm population declines repeated on BBS
Research needs	What are limiting factors?, is the species reproducing sufficiently in artificial/managed habitats?, effects of silvicultural practices, especially snag retention and removal.
Outreach needs	Inform managers and land-owners of steeply declining and threatened populations, important to identify breeding locations and potential threats
Habitat conservation objectives	Identification of key sites/habitats for species throughout the BCR 14, assessment of habitat conditions, experimental habitat manipulations to increase local populations
Focus area/site conservation objectives	

Species	Rusty Blackbird
Status	BCR 14 High Priority; PIF Continental Watch List; Special Concern in Maine & Vermont, uncertain BBS trend (-0.96%/yr, P=0.88 for 1966-1999 in BCR 14)
Importance and role of BCR-14	Uses habitat very characteristic of BCR 14 (wooded swamps, bogs, alder/willow thickets, conifer swamps, etc.),
Conservation issues and threats in BCR-14	Adverse to clearcutting, rapid declines rangewide but uncertain in BCR 14, apparently vulnerable to competition from open area species, reduction of wooded wetlands, large territories (.5km), southern end of range (1.1% of breeding population in BCR), important habitat integrator (e.g., mosaics and snags)
Population objectives	Double current population (PIF)
Monitoring needs	Not well known in BCR14, need basic information on distribution and demography, uncertain population trends
Research needs	Document breeding habitat needs in BCR 14; more information on home range
Outreach needs	
Habitat conservation objectives	Large spruce bog wetland mosaics in “reserve” status and embedded in landscape level management areas with appropriate forest management
Focus area/site conservation objectives	

Species	Chimney Swift
Status	BCR 14 High Priority; no legal status; declining BBS trend (-3.78% /yr, P<0.001 for 1966-1999 in BCR 14)
Importance and role of BCR-14	1.8% of breeding population in BCR 14
Conservation issues and threats in BCR-14	Population declines, loss of nesting structures (chimneys, big trees), potential decline of prey availability due to pesticides, pesticide toxicity
Population objectives	Stabilize population
Monitoring needs	Develop survey method for this species as BBS routes are not adequate for monitoring this species.
Research needs	Investigate reasons for declines
Outreach needs	Work with the industrial forest industry to leave more large old trees that could serve as nest sites, landowner contacts should be made at each site to encourage proper management of the species, distribute information materials to landowners on the use of roof tops/chimneys as nesting sites, develop and implement public education programs to encourage reports of Chimney Swifts and aid in the monitoring and assesement of the populations.
Habitat conservation objectives	Preserve more large old trees, especially in the industrial forest
Focus area/site conservation objectives	

Species	Eastern Wood-Pewee
Status	BCR 14 High Priority; no legal status; continental declines but common near forest clearings and edges in deciduous or mixed forest; declining BBS trend (-2.99%/yr, $P < 0.001$ for 1966-1999 in BCR 14)
Importance and role of BCR-14	Moderate responsibility – 4% of breeding population in BCR 14
Conservation issues and threats in BCR-14	Threats not well understood, apart from habitat loss
Population objectives	Halt declines and stabilize the population trend
Monitoring needs	Well covered by BBS – continue monitoring through BBS
Research needs	Identify causes of declines in populations.
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	Deciduous forest zones

Species	American Redstart
Status	High priority in BCR 14; no legal status; declining BBS trend in BCR 14 (-1.07%/yr, P=0.013 for 1966-1999)
Importance and role of BCR-14	According to BBS estimates, >8% of this species population occurs in BCR 14. These same data also indicate a persistent population decline.
Conservation issues and threats in BCR-14	Some data suggest population decline may be partially a result of forest maturation over the last 40-50 years, although redstarts remain common in many older forests. Equally important may be habitat conversion on the wintering grounds, which has been linked to lower survival, a biased sex ratio, and delayed arrival to breeding grounds.
Population objectives	If habitat maturation is behind declines, it is unreasonable to expect regional populations to rebound to historic levels. In any event, the species is still common, and a simple reversal of declines may be sufficient to maintain it.
Monitoring needs	Probably adequately sampled by BBS
Research needs	Although heavily studied, the habitat relationship mentioned above has not been studied with respect to productivity. In other words, do redstarts produce more young in the early-to-mid successional habitats where they are more common? Additional research has implicated winter-ground events in survivorship, and we can thus not ignore landscape level processes operating outside of BCR 14.
Outreach needs	
Habitat conservation objectives	This species may benefit most from some sort of shifting mosaic approach. See comments under Population Objectives above.
Focus area/site conservation objectives	Redstarts will likely benefit from the maintenance of large areas of habitat where natural successional processes are allowed or simulated.

Species	Black-throated Blue Warbler
Status	High Priority in BCR 14; no legal status; stable BBS trend in BCR 14 (+0.964%/yr; P=0.285 for 1966-1999)
Importance and role of BCR-14	High BCR responsibility (32% of breeding population). Highest concentrations occur in parts of this BCR (Adirondacks, etc.)
Conservation issues and threats in BCR-14	Forest maturation may reduce preferred habitat in some areas, unknown effects of forest pathogens on habitat structure and thus productivity. The species is declining in Adirondacks, leading to questions and concerns about what is going on there. The potential impacts of declines in sugar maple, American beech, and even eastern hemlock are also of concern. However, in many parts of BCR 14 the species is stable or increasing, and often reaches high densities where it occurs.
Population objectives	Maintain current populations
Monitoring needs	Well sampled by BBS and other forest studies.
Research needs	None – perhaps one of the most studied warblers in North America.
Outreach needs	Perhaps BTBW could be crafted into a “flagship species” for healthy hardwood/transition forests. It’s certainly attractive enough, and could be the source of numerous fascinating ecological stories spun for the general public.
Habitat conservation objectives	Maintain current configurations
Focus area/site conservation objectives	Large areas of mature forest with well-developed understory structure would probably be the best way to ensure this species’ continued presence.

Species	Boreal Chickadee
Status	BCR 14 High Priority; no legal status; declining BBS trend (-6.54% /yr, P<0.001 for 1966-1999 in BCR 14)
Importance and role of BCR-14	permanent resident; some areas of higher breeding density in Nova Scotia and northern Maine/southern New Brunswick
Conservation issues and threats in BCR-14	Supply of habitat (forest management), rangewide population decline and significant longterm decline in BCR 14
Population objectives	Stabilize population trend
Monitoring needs	Clarify how well BBS samples this species
Research needs	Investigate causes of decline (including winter ecology and forest fragmentation), clarify habitat relationships (stand level and patch size)
Outreach needs	
Habitat conservation objectives	Determine how much habitat for this species currently exists and develop a process to determine a biologically meaningful habitat threshold (objective)
Focus area/site conservation objectives	Spruce/fir forests within the BCR

Species	Chestnut-sided Warbler
Status	BCR 14 High Priority; no legal status; decreasing BBS population but still widespread (-1.54%/yr, $P < 0.001$ for 1966-1999 in BCR 14)
Importance and role of BCR-14	12.8% of breeding population in BCR 14; focal species for early successional habitat in this BCR
Conservation issues and threats in BCR-14	Limited and declining early successional/edge habitat; predation; housing developments
Population objectives	Reverse declines and increase population
Monitoring needs	Monitor populations in clearcuts, including reproductive success
Research needs	Study area requirements for stable populations; investigate population demographics in different successional habitats (e.g., edges vs clearcuts); how best to manage early successional habitat for this species; develop prescriptions for maintaining sufficient amounts of early successional habitat for dependent species within greater context of a balanced forest ecosystem
Outreach needs	Educate the public about the role of natural disturbance, how it has been suppressed in many places, and the species that are dependent on these habitats
Habitat conservation objectives	Maintain and increase areas with early successional habitat – work with timber industry on managing clearcuts
Focus area/site conservation objectives	

Species	Cape May Warbler
Status	BCR 14 High Priority; no legal status; possible BBS declines (-1.54%/yr, P=0.28 for 1966-1999 in BCR 14)
Importance and role of BCR-14	4.1% of breeding population in BCR 14
Conservation issues and threats in BCR-14	Concern over long term loss of mature conifer forests
Population objectives	Halt declines and strive for long term population increase
Monitoring needs	Continue BBS monitoring – seems to be sufficient for now
Research needs	Relationships to spruce budworm cycles
Outreach needs	Discuss need of this and related species for older growth conifer forest with forest managers and develop a link to forest management planning
Habitat conservation objectives	Maintain existing patches of mature conifer forest and incorporate plans for older growth patches into forest management
Focus area/site conservation objectives	Remaining patches of mature conifer forest

Species	Veery
Status	BCR 14 High Priority; no legal status; declining BBS trend (-1.19% /yr, P=0.002 for 1966-1999 in BCR 14)
Importance and role of BCR-14	16.1% of breeding population in BCR 14 = high responsibility; high breeding densities throughout most of this BCR
Conservation issues and threats in BCR-14	Loss of understory in maturing forests; also uses early to mid successional forests, so loss of successional forests is of concern
Population objectives	Halt population declines
Monitoring needs	Continue monitoring by BBS
Research needs	Investigate reasons for decline and determine status of wintering habitat.
Outreach needs	?
Habitat conservation objectives	Increase habitat quality by improving understory vegetation structure in maturing forests; species also makes use of early and mid-successional forest so it may benefit from shifting mosaic practices.
Focus area/site conservation objectives	?

Species	Blackburnian Warbler
Status	Moderate Priority in BCR 14; no legal status; increasing BBS trend in BCR 14 (+1.5%/yr, P=0.030 for 1966-1999)
Importance and role of BCR-14	High BCR responsibility (14% of population). Moderate BCR threat.
Conservation issues and threats in BCR-14	Spread of hemlock wooly adelgid and impact on eastern hemlock forests; habitat loss on wintering grounds
Population objectives	Maintain current populations
Monitoring needs	Not as well sampled by BBS as many other forest species, but it's not clear how to remedy this situation other than with extensive use of habitat specific surveys.
Research needs	Develop a better understanding of the role of stand age and stand structure on habitat quality and ultimately survival and reproductive success
Outreach needs	
Habitat conservation objectives	Ensure that a minimum of 10%-20% of sub-regional planning units (commercial licenses, townships, etc.) involved in timber production be maintained as mature or overmature coniferous forest; for conservation lands that support coniferous forest, maintenance of considerably larger percentages of land area in mature or overmature age classes is desirable to offset potential shortfalls or temporal bottlenecks.
Focus area/site conservation objectives	Large areas of mature conifer or mixed conifer-hardwood forests would probably be the best way to ensure this species' continued presence.

Species	Bobolink
Status	BCR 14 High Priority; no legal status; declining BBS trend (-2.23% /yr, P<0.001 for 1966-1999 in BCR 14)
Importance and role of BCR-14	9.3% of continental breeding population in BCR 14
Conservation issues and threats in BCR-14	>50% population decline during past 30 years; grassland management – haying during the breeding season; loss of grassland habitat; elevated predation near edges?
Population objectives	Halt population declines
Monitoring needs	Continue BBS monitoring; also monitor the rate of loss of habitat in high priority areas and the distribution of habitat and populations across landscapes within the region (metapopulation/ source-sink perspective)
Research needs	Conduct a population viability analysis; investigate metapopulation structure and source-sink dynamics; pesticide use on winter grounds
Outreach needs	Promote grassland management techniques that benefit grassland birds to farmers and other grassland managers
Habitat conservation objectives	Maintain suitable habitat distributed across the landscape to support viable metapopulation structure
Focus area/site conservation objectives	

Species	Common Nighthawk
Status	High Priority in BCR 14; declining BBS trend in BCR 14 (-2.106%/yr, P=0.035 for 1966-1999)
Importance and role of BCR-14	Declines have been documented in ... (all Canadian jurisdictions, NH...). Species is otherwise widespread across much of North America, and remains common over much of its range.
Conservation issues and threats in BCR-14	At least in NH, threats are believed to be two-fold: 1) conversion of urban rooftops from small gravel to other materials 2) loss of pine barrens and similar habitats In addition, other threats may include loss of prey base, wintering ground effects, and habitat maturation (understory growth, fire suppression).
Population objectives	Good question. If nothing else, it would be desirable to have the species return to portions of its range that have been vacated in the last 10-20 years.
Monitoring needs	Targeted monitoring (both rural and urban populations), demographic research, effects of roof construction, pesticide/contaminant effects.
Research needs	Demographic and micro-habitat selection data are lacking that could test the roof-change hypothesis for urban declines.
Outreach needs	In absence of the above, it can't hurt to make groups working on urban revitalization and urban wildlife issues aware of the nighthawk decline, and perhaps encourage changes in roof construction where feasible (and where nighthawks persist).
Habitat conservation objectives	See above. Also, "no net loss" of pine barrens.
Focus area/site conservation objectives	Poorly known, populations are small in all U.S. jurisdictions in BCR 14 (larger urban areas that support the species are generally in BCR 30). In NH, a relatively large population occurs in the Ossipee Pine Barrens, and another is in the city of Keene.

Species	Northern Parula
Status	Moderate Priority in BCR 14, increasing BBS trend in BCR 14 (+1.357%/yr, P=0.028 for 1966-1999)
Importance and role of BCR-14	High BCR responsibility (23% of population). Moderate BCR threat.
Conservation issues and threats in BCR-14	Habitat loss? In southern areas of BCR, species is most common in largely marginal coniferous habitats. This situation may be different in northern Maine and Canada, where extensive tracts of pulpwood are still harvested extensively. There may also be some cause for concern about the effects of air pollution on <i>Usnea</i> lichens, which are a preferred nesting material.
Population objectives	Maintain current populations
Monitoring needs	Fairly well sampled by BBS, and as such may not need additional work.
Research needs	Effects of air pollution on <i>Usnea</i> ?
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	Large areas of mature conifer forest would probably be the best way to ensure this species' continued presence.

Species	Ruffed Grouse
Status	BCR 14 Moderate Priority; hunted species; declining BBS trend (-5.32%/yr, P=0.03 for 1966-1999 in BCR 14)
Importance and role of BCR-14	3.2% of breeding population in BCR 14; important recreational species
Conservation issues and threats in BCR-14	Loss of early successional habitat; importance of industrial forest practices for the viability of populations in this BCR; public perception against even-age forest management, but this species does best with a mosaic of habitat types and ages, so cutting smaller blocks within a mosaic might better than one large clearcut
Population objectives	Halt declines and increase population (double current population?)
Monitoring needs	More widespread use of drumming surveys
Research needs	
Outreach needs	Education on the benefit of even-age forestry for ruffed grouse and associated species; heavy selection cuts can also create good habitat
Habitat conservation objectives	Increase early-successional habitat; cluster management sites
Focus area/site conservation objectives	

Species	Upland Sandpiper
Status	moderate priority in BCR 14 Endangered in ME, *MA, *NH, *VT; T in *NY - *Note that few if any UPSAs occur in the BCR 14 portions of these states.
Importance and role of BCR-14	Significant declines in BCR, although bulk of population occurs elsewhere. Largely persists in heavily managed habitats (airports, agricultural land)
Conservation issues and threats in BCR-14	Habitat loss and management. Continued losses of agricultural land to succession or development are the main cause of this species' decline in the region. Where it does occur, mowing regimes or pesticide use may compromise survival or reproduction. Also concerns about trend toward more intensive agricultural practices.
Population objectives	Increase populations at currently occupied sites? (since I don't even know where these are in the BCR – except NE Maine – I'm not sure how feasible this is, and thus remain unconvinced of the role of BCR 14 in any long-term conservation strategy for the species)
Monitoring needs	Do we even have a good handle on the regional population? Might be more of an inventory need.
Research needs	Apply findings from core of range.
Outreach needs	Work with farmers and airport managers to develop management agreements that allow multiple uses at UPSA sites.
Habitat conservation objectives	
Focus area/site conservation objectives	Blueberry barrens in Maine and Maritime Provinces; potato farms in NE Maine

Species	Whip-poor-will
Status	moderate priority in BCR 14, conservation concern in NH
Importance and role of BCR-14	“high BCR threat” Anecdotal declines are apparent overmuch of (northern?) range, and some of the current concern for this species rests on the fact that this decline is difficult to document.
Conservation issues and threats in BCR-14	Presumably, the largest threat to this species in the BCR is habitat loss. WPWs prefer open forests or early successional habitat with well-drained soils, and such areas are often the first to go for development, gravel pits, and the like. Since it nests on the ground, increasing predator populations in habitat fragments may also be an important factor. There has also been some discussion about possible declines in populations of the large night flying insects on which WPWs feed.
Population objectives	Uncertain, since there are no clear benchmarks to work with.
Monitoring needs	Species is not well-sampled by BBS, and thus requires targeted nocturnal surveys in appropriate habitats. Some of these have been initiated in MA and parts of NH, but there may be a need for some sort of range-wide program modeled on the BBS. The benefit here is that the species is easily identifiable and often very vocal.
Research needs	Currently there are no concrete data on habitat preference beyond the largely anecdotal.
Outreach needs	Whip-poor-wills may be a good flagship species for pine barrens and similar habitats. There is a certain “romanticism” about them that may be useful in galvanizing public support for habitat conservation.
Habitat conservation objectives	Hard to say until habitat/population relationships are better known.
Focus area/site conservation objectives	I suspect all jurisdictions could identify their current WPW hotspots. In NH they include (but are probably not limited to) the Ossipee Pine Barrens and areas near the Merrimack River and its higher order tributaries.

Species	Yellow-bellied Flycatcher
Status	Common breeder in high-elevation and lowland spruce-fir forests in BCR 14, north of 44 degrees latitude. BBS data show stable numbers in BCR 14.
Importance and role of BCR-14	Nonsignificant trends elsewhere and BCR-wide, fluctuating numbers in White Mountain National Forest between 1992 and 1999. Nonsignificant trend between 1991-2000 at high elevations in Vermont.
Conservation issues and threats in BCR-14	Threats: Degradation of habitat from forest fragmentation and human development (i.e. ski resorts); potential conversion of spruce-fir forests to hardwoods due to climate change.
Population objectives	Maintain current population
Monitoring needs	Adequately monitored at high elevations by Mountain Birdwatch and at high latitudes by BBS.
Research needs	Research needs are extensive and include: life history, vocal repertoire, effects of acid rain on conifer-forest habitat and the impacts of forest-and wetland- management practices. Little knowledge is due to the remoteness of its habitat, its northern distribution, and its low levels of detectability.
Outreach needs	
Habitat conservation objectives	Conservation and management of arroyo vegetation in wintering grounds located in Southern Mexico and Central America.
Focus area/site conservation objectives	Adirondacks, Green Mountains, White Mountains, Essex County, VT, northern Coos County, NH

Species	Black-backed Woodpecker
Status	Uncommon in spruce-fir forests of Adirondacks, Essex County, VT, northern New Hampshire, northern Maine, eastern Quebec, New Brunswick, Nova Scotia, PEI.
Importance and role of BCR-14	BBS data suggest a stable or slightly increasing population in BCR 14 for the period of 1966–2003. However, BBS data for period of 1980-2003 shows significant downward trends in BCR 14.
Conservation issues and threats in BCR-14	Threats: Suppression of forest fire in fire-dependent systems; climate change; and short rotation timber harvesting.
Population objectives	Increase populations in BCR 14.
Monitoring needs	Increase the number of nests monitored to determine nest success and gather more data on breeding and wintering foraging behavior in logged and unlogged burned forests.
Research needs	.Investigate the spatial and temporal pattern of stand-replacement fires; examine relationship between prefire forest structure and postfire bird communities; quantify numeric responses of Black-backed woodpeckers to outbreaks of spruce beetles in the absence of fire and increase understanding of basic demographic information of the species.
Outreach needs	
Habitat conservation objectives	Species prefers flooded, burned or old-spruce-fir forests, where cavity trees > 30cm dbh are available and where wood- and bark-boring insects are abundant. Diminish the chance of large, severe wildlife fires, which may have negative consequences for Black-backed woodpecker, with prescribed burning programs and clearing of vegetative fuels
Focus area/site conservation objectives	In Vermont, Victory and Nulhegan Basins; in New Hampshire, White Mountain National Forest and northern Coos County; for Adirondacks, consult Brian McCallister (birder64@yahoo.com).

Species	Boreal Owl
Status	Few reliable estimates available.
Importance and role of BCR-14	Little known of importance of this BCR to the species.
Conservation issues and threats in BCR-14	Threats: Indirect effects of forest cutting are probably the most important influence of humans upon the species. In addition, reduction of prey numbers due to timber harvest and climate change.
Population objectives	Increase populations in BCR 14.
Monitoring needs	Monitor demographic characteristics...
Research needs	Investigation of demographic information and characteristics, local and regional populations, and response to habitat change is highly needed for this species.
Outreach needs	
Habitat conservation objectives	Management should involve retaining large-diameter snags in clearcuts and could include establishing systems of nest boxes to monitor populations. In coniferous forests with patches of large-diameter aspen, retention of aspen for nesting may be important. Mature and older forests provide quality nesting, foraging, and summer roosting habitat. Selective tree harvest may allow for tree removal while maintaining suitable habitat.
Focus area/site conservation objectives	

Species	Blue-winged Warbler
Status	High Priority in BCR 14; no legal status; species has been expanding its range northward into this BCR; BBS trends show potential increase (+4.8%/yr; P = 0.22 for 1966-2002) but with a small number of routes
Importance and role of BCR-14	Moderate BCR responsibility (1% of global breeding population)
Conservation issues and threats in BCR-14	Threats: urban/suburban development; lack of adequate disturbance events in forested areas in southern portions of the BCR
Population objectives	Maintain current population levels
Monitoring needs	Does not yet occur on large enough number of BBS routes to adequately track population trends within this BCR; track population expansion through atlas efforts and other monitoring programs
Research needs	Study how regional patterns of forestry, human development, and farmland abandonment may lead to continued range expansion or contraction
Outreach needs	
Habitat conservation objectives	Conserve and enhance adequate shrub / early successional habitat to promote sustained populations of native species within this habitat
Focus area/site conservation objectives	

Species	Long-eared Owl
Status	BCR 14 High Priority No BBS data
Importance and role of BCR-14	Insufficient information to know
Conservation issues and threats in BCR-14	Threats: loss and degradation of open habitats used especially for foraging and loss of suitable nest sites
Population objectives	At a minimum, maintain current population levels until more information becomes available
Monitoring needs	Develop and implement a monitoring program for nocturnal species, especially owls; need to determine population size and trends
Research needs	Develop understanding of habitat requirements and limiting factors
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Bald Eagle
Status	BCR 14 Moderate Priority Federally Threatened – U.S. Increasing BBS trend in BCR 14 (+4.9%/yr; P = 0.09 for 1966-2002)
Importance and role of BCR-14	Moderate BCR responsibility (1% of global breeding population)
Conservation issues and threats in BCR-14	Threats: alteration of wetland habitat through draining, dredging, filling, pollution, acid rain, agricultural practices, and siltation.; contamination from various pollutants
Population objectives	Maintain current population levels
Monitoring needs	Maintain current levels of monitoring
Research needs	
Outreach needs	
Habitat conservation objectives	preservation of existing wetland sites should be the first priority
Focus area/site conservation objectives	

Species	Bank Swallow
Status	BCR 14 Moderate Priority Decreasing BBS trend in BCR 14 (-2.1%/yr; P= 0.21 for 1966-2002)
Importance and role of BCR-14	Moderate-High BCR Responsibility (5% of global breeding population)
Conservation issues and threats in BCR-14	Threats: loss of nesting sites; risks from pesticides and other contaminants?
Population objectives	Increase BCR population by 10% (PIF continental objective)
Monitoring needs	BBS may not be the best long-term population-monitoring method because of ephemeral nature of colony sites. Breeding Bird Atlases could be a better technique because colony sites can be sought out and documented more readily. (from Birds of North America account)
Research needs	Better understanding of limiting factors; habitat usage, distribution, and behavior during migration and winter in the Americas (from Birds of North America account)
Outreach needs	
Habitat conservation objectives	Protect existing nest sites and create additional nest sites
Focus area/site conservation objectives	

Species	Barn Swallow
Status	Moderate Priority in BCR 14 Decreasing BBS trend in BCR 14 (-4.0%/yr; $P < 0.01$ for 1966-2002)
Importance and role of BCR-14	Moderate-High BCR Responsibility (2% of global breeding population)
Conservation issues and threats in BCR-14	Threats: modern buildings and farming practices may reduce suitability of nest sites and foraging areas; unknown if pesticides and other contaminants are a threat
Population objectives	Increase population by 50% (PIF continental objective)
Monitoring needs	Adequately covered by BBS
Research needs	Investigate limiting factors and causes of declines
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Black-throated Green Warbler
Status	BCR 14 Moderate Priority Stable BBS trend in BCR 14 (+0.2%/yr; P = 0.73 for 1966-2002)
Importance and role of BCR-14	High BCR Responsibility (18.4% of global breeding population)
Conservation issues and threats in BCR-14	Threats: forest management resulting in changes in species, age, and structural composition of deciduous and mixed forests; habitat loss and fragmentation associated with development; habitat loss on migration and wintering grounds
Population objectives	Increase current population by 10% (PIF continental objective)
Monitoring needs	
Research needs	Demographic studies to help determine limiting factors
Outreach needs	
Habitat conservation objectives	target large blocks of deciduous/mixed forest for conservation; develop comprehensive forest management plan to maintain adequate amount of all priority forest types and successional stages
Focus area/site conservation objectives	

Species	Brown Creeper
Status	BCR 14 Moderate Priority Possible increasing BBS trend in BCR 14 (+4.6%/yr; P = 0.13 for 1966-2002)
Importance and role of BCR-14	Moderate-High BCR responsibility (6.2% of global breeding population)
Conservation issues and threats in BCR-14	Threats: decreased habitat suitability due to forest harvest - needs large trees, large snags, and older-growth forests for feeding and nesting sites; Species strongly associated with older, conifer and conifer-hardwood forests, where large-diameter live trees for foraging sites and large-diameter, dead or dying trees with sloughing bark or thick bark for nest sites are abundant due to natural processes. (from Birds of North America account)
Population objectives	Increase current population by 10% (PIF continental objective)
Monitoring needs	Special monitoring methods would help to better track trends of this bird (an inconspicuous, interior forest associate) - not sampled well by the BBS.
Research needs	Information on basic breeding biology; better understanding of effects of logging and forest fragmentation
Outreach needs	Develop guidelines for forest management that benefit species in need of some older, larger trees
Habitat conservation objectives	Promote silvicultural treatments that retaining a high density of the largest trees and snags available. High density of large live trees, dying trees and snags likely to be essential to retain suitable foraging and nesting habitat.
Focus area/site conservation objectives	

Species	Gray Jay
Status	BCR 14 Moderate Priority Uncertain BBS trend in BCR 14 (-0.8%/yr; P = 0.42 for 1966-2002)
Importance and role of BCR-14	Low BCR responsibility (<1% of global population)
Conservation issues and threats in BCR-14	Threats: loss of suitable habitat
Population objectives	Maintain current population (PIF continental objective)
Monitoring needs	
Research needs	
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Horned Lark
Status	BCR 14 Moderate Priority Decreasing BBS trend in BCR 14 (-10.9%/yr; $P < 0.01$ for 1966-2002)
Importance and role of BCR-14	Low BCR responsibility (<1% of global population)
Conservation issues and threats in BCR-14	Threats: loss of open land associated with declining farm practices including residential development and reversion to forest; agricultural practices; contaminants
Population objectives	Increase current population by 50% (PIF continental objective)
Monitoring needs	Monitored reasonably well by BBS; targeted grassland bird surveys might provide better method for tracking regional trends
Research needs	Demographic studies to better understand limiting factors and population structure
Outreach needs	
Habitat conservation objectives	Develop best management practices and implement integrated management plans for grasslands on public and private lands
Focus area/site conservation objectives	

Species	Northern Flicker
Status	BCR 14 Moderate Priority Stable BBS trend in BCR 14 (-0.6%/yr; P = 0.08 for 1966-2002)
Importance and role of BCR-14	Moderate-high BCR Responsibility (2.4% of global breeding population)
Conservation issues and threats in BCR-14	Threats: loss of suitable nest-cavity trees; competition for nest cavities; contaminants;
Population objectives	Increase current population by 50% (PIF continental objective)
Monitoring needs	Appears to be covered well by BBS
Research needs	Basic research to determine whether nest-substrate availability limits populations, including more experiments involving manipulation of snag density; demographic studies to determine other possible limiting factors (from Birds of North America account)
Outreach needs	
Habitat conservation objectives	Retain more snags and some larger live trees as part of forest management practices to increase suitable substrates for nest cavities
Focus area/site conservation objectives	

Species	Northern Goshawk
Status	BCR 14 Moderate Priority Uncertain BBS trend in BCR 14 (-8.9%/yr; P = 0.50 for 1966-2002)
Importance and role of BCR-14	Moderate BCR Responsibility (1.5% of global breeding population)
Conservation issues and threats in BCR-14	Threats: human disturbance at nests and roost sites; degradation of habitat from inappropriate timber harvest; contaminants
Population objectives	Increase current population by 10% (PIF continental objective)
Monitoring needs	Better monitoring program for tracking population trends of forest-breeding raptors is needed
Research needs	Develop understanding of how predation, competition, landscape alteration, and food availability regulate populations. Determine how changes in forest structure and landscape pattern affect population viability. (from Birds of North America account)
Outreach needs	Communicate to forest landowners and managers appropriate forest management practices that will benefit Goshawks and improve habitat suitability
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Northern Harrier
Status	BCR 14 Moderate Priority Stable BBS trend in BCR 14 (0.0%/yr; P = 0.99 for 1966-2002)
Importance and role of BCR-14	Moderate BCR Responsibility (1% of global breeding population)
Conservation issues and threats in BCR-14	Threats: loss of grassland and wetland habitats for breeding and foraging activities; disturbance at nests and roost sites; contaminants
Population objectives	Increase current population by 50% (PIF continental objective)
Monitoring needs	Current monitoring activities seem to be adequate
Research needs	Assess the impact of predation on reproduction; monitor habitat loss and the effects of environmental contaminants on populations
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Ovenbird
Status	BCR 14 Moderate Priority Stable BBS trend in BCR14 (+0.3%/yr; P = 0.36 for 1966-2002)
Importance and role of BCR-14	High BCR Responsibility (11.6% of global breeding population)
Conservation issues and threats in BCR-14	Threats: forest fragmentation, especially in southern portion of the BCR where there is more human development;
Population objectives	Maintain current population levels (PIF continental objective)
Monitoring needs	Monitored adequately by BBS
Research needs	Quantified information on habitat and densities by habitat type throughout the winter range is needed to improve understanding of winter ecology. Information on habitat used during migration also needed.
Outreach needs	
Habitat conservation objectives	Conserve large tracts of contiguous deciduous or deciduous-mixed forest habitat
Focus area/site conservation objectives	

Species	Palm Warbler
Status	BCR 14 Moderate Priority Increasing BBS trend in BCR 14 (%3.4/yr; P = 0.08 for 1966-2002)
Importance and role of BCR-14	Moderate BCR Responsibility (1% of global breeding population)
Conservation issues and threats in BCR-14	Threats: loss of bog habitat, especially in Quebec, from draining and peat harvesting; collision with structures (i.e., communication towers) during migration; fragmentation of upland forest around bog/peat lands
Population objectives	Maintain current population level (PIF continental objective)
Monitoring needs	Appears to be adequately monitored by BBS
Research needs	Information on basic breeding biology and demography
Outreach needs	
Habitat conservation objectives	Protect critical bog habitat
Focus area/site conservation objectives	

Species	Peregrine Falcon
Status	BCR 14 Moderate Priority No BBS data – population larger than during DDT years
Importance and role of BCR-14	Low BCR Responsibility (0.25% of global breeding population)
Conservation issues and threats in BCR-14	recently federally de-listed; still species of concern in most jurisdictions
Population objectives	Maintain current population level (PIF continental objective)
Monitoring needs	Need for monitoring population trends and productivity as part of de-listing activities
Research needs	
Outreach needs	
Habitat conservation objectives	Protect nesting sites from physical alteration or destruction and from excessive human disturbances
Focus area/site conservation objectives	

Species	Pine Grosbeak
Status	BCR 14 Moderate Priority Decreasing BBS trend in BCR 14 (-5.0%/yr; P = 0.20 for 1966-2002)
Importance and role of BCR-14	Moderate-Low Responsibility for the entire BCR (0.5% of global breeding population), but much higher responsibility in Canada
Conservation issues and threats in BCR-14	Unknown what the threats might be from forest management practices
Population objectives	Increase current population by 10% (PIF continental objective)
Monitoring needs	Might not be surveyed well by BBS due to low breeding densities in many areas – need to develop better means of tracking trends of low density birds; assess population status
Research needs	Effects of forest management on the abundance, breeding density, and nesting success of this species
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Short-eared Owl
Status	BCR 14 Moderate Priority No BBS data
Importance and role of BCR-14	Low BCR Responsibility for breeding population; Moderate BCR Responsibility for migrating and wintering populations
Conservation issues and threats in BCR-14	Considered to have high threats in this BCR due to lack of suitable breeding habitat and impacts of agricultural practices and human development
Population objectives	Double current population (PIF continental objective)
Monitoring needs	Poorly monitored by BBS; need monitoring program specifically targeting owls and other nocturnal or crepuscular birds
Research needs	Assess factors other than habitat loss (e.g., levels of prey or predation) that might be affecting distribution and abundance
Outreach needs	
Habitat conservation objectives	maintain large continuous tracts of habitat for the owl and its prey
Focus area/site conservation objectives	

Species	Vesper Sparrow
Status	BCR 14 Moderate Priority Decreasing BBS trend in BCR 14 (-3.3%/yr; P = 0.05 for 1966-2002)
Importance and role of BCR-14	Low BCR Responsibility (0.11% of global breeding population), but higher responsibility for eastern subspecies
Conservation issues and threats in BCR-14	Threats: loss of open agricultural grasslands; changes toward more intense agricultural practices; human development
Population objectives	Increase current population by 50% (PIF continental objective)
Monitoring needs	Appears to be adequately covered by BBS, although a targeted regional grassland survey effort might provide better regional estimates of population trends
Research needs	Studies of breeding ecology and demography to help identify limiting factors
Outreach needs	
Habitat conservation objectives	Within the agriculturally dominated landscapes of the BCR, utilize grassland easements and other management programs to maintain open grassland habitat with appropriate management practices (e.g., late mowing).
Focus area/site conservation objectives	

Waterbird Priority Species Data Sheets

Species	Common Loon
Status	moderate priority for BCR 14 NAWCP status - moderate Currently not at risk (COSEWIC) NY – Special Concern
Importance and Role of BCR-14	4% of NA population Breeds across BCR 14 with exception of extreme southern populations.
Conservation issues and threats in BCR-14	Acidification, mercury, habitat degradation & loss, disturbance, oil pollution in winter
Population objectives	Maintain current levels (Marshbird Plan [NAWCP 2]) 550,000 NA [NAWCP] 11,000 BCR 14 [NAWCP] 15% increase = 6,785 individuals in BCR 14 [MANEM regional waterbird group]
Monitoring objectives	Continue and expand the Canadian Lakes Loon Survey; survey for population abundance and distribution in areas not completely monitored across the BCR; monitor productivity; migration monitoring V, NH, Ma monitoring every pair Me, NY, NS partial monitoring NB, PQ little monitoring
Research objectives	Determine impacts of human disturbance Linking wintering and breeding populations Identify appropriate census interval Continued work on mercury Impacts of botulism outbreaks and emaciation syndrome
Outreach needs	Need to continue high level of outreach and education in southern regions of BCR 14 as development and recreation along waterbodies increases
Habitat conservation objectives	Reduce disturbance in key breeding areas Protect wetland habitat Protect coastal wintering areas from oil spills
Focus area/site conservation objectives	Large wetlands (>10 acres)

Species	Red-throated Loon
Status	Moderate priority for BCR 14 NAWCP - high concern
Importance and Role of BCR-14	Important wintering area Continental population 125,000 pairs
Conservation issues and threats in BCR-14	Oil pollution By-catch Biotoxins Contaminants
Population objectives	Default population objective is to maintain current population, until better monitoring information becomes available. [MANEM regional waterbird group]
Monitoring objectives	Need improved monitoring to determine status and develop population objectives; Conduct migration/ wintering counts
Research objectives	Determine genetic relatedness between eastern and western populations
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Red-necked Grebe
Status	high priority for BCR 14 Currently not at risk (COSEWIC, NAWCP)
Importance and Role of BCR-14	Eastern pop'n: 15-20% (wintering) NA pop'n: 55-70,000 pairs Wintering and migratory use of BCR 14
Conservation issues and threats in BCR-14	Reduce threats from oil pollution in coastal waters, commercial fisheries by-catch, biotoxins, contaminants
Population objectives	Maintain current populations [MANEM regional waterbird group]
Monitoring objectives	develop methods; coastal surveys Conduct winter/ migration surveys
Research objectives	Determine genetic relatedness between eastern and western populations
Habitat conservation objectives	Reduce exposure to oil pollution in over wintering, marine areas
Focus area/site conservation objectives	

Species	Leach's Storm-Petrel
Status	Moderate priority for BCR 14 NACWP - low concern Currently not at risk (COSEWIC) Population has declined since 19070s; current BCR population estimate is 220,700
Importance and Role of BCR-14	<0.1% of NA population
Conservation issues and threats in BCR-14	gull predation in small colonies; human disturbance; fox predation (Magdalen Islands) 80% of Maine population on 2 islands separated by 1 mile (Maine population 10,000 pair) Potential contaminants - mercury has increased 73% at Canadian colonies 1970s - 2000
Population objectives	Restore BCR population to 1970's level (345,000-420,000); increase size and number of small colonies [MANEM regional waterbird group]
Monitoring objectives	Establish monitoring program at main colonies (see below)
Research objectives	Estimate demographic parameter values, in particular breeding success and survival; impact of gull predation
Habitat conservation objectives	Reduce gull and fox predation at affected colonies Develop techniques to enhance habitat
Focus area/site conservation objectives	Country Island Kent Island Bon Portage Island Great Duck Island, Me Little Duck Island, Me Brion Island, Qu Bonaventure, Qu (abandoned; foxes)

Species	Great Cormorant
Status	highest priority for BCR 14 NAWCP - high concern Currently not at risk (COSEWIC)
Importance and Role of BCR-14	>90% of NA population (~11,000 pairs) - very high responsibility in BCR 136 pairs in Maine at 8 sites, 660 pairs in Quebec, remainder in NS, PEI BCR population estimated at 12,300 breeding birds.
Conservation issues and threats in BCR-14	Occasional DCCO hunt; “nuisance” status in New Brunswick Threats include: Persecution, bycatch (QC), predation from gulls and eagles, habitat loss, competition for nesting, changes in food availability, very sensitive to human visitation and disturbance on nesting islands, limited number and distribution of colonies. Only a few colonies have large numbers (impact on these colonies could significantly impact population)
Population objectives	
Monitoring objectives	Continue regular monitoring (every 5 years in NS, every year in PEI) Need to develop more strategies to monitor the species productivity.
Research objectives	Estimate breeding success at selected colonies Evaluate factors that limit population growth.
Habitat conservation objectives	Continue efforts to secure priority nesting islands through conservation ownership.
Focus area/site conservation objectives	Atlantic coast of NS Prince Edward Island Cape Breton Island St. Lawrence Estuary

Species	Northern Gannet
Status	high priority for BCR 14 NAWCP - low concern Currently not at risk (COSEWIC)
Importance and Role of BCR-14	69% of NA population at two colonies in QC; very high responsibility in BCR
Conservation issues and threats in BCR-14	Threats include: Population increasing - human persecution in NB Oil Spills Bycatch Mortality seen on beaches in NB (physical injury) Numbers concentrated in two large colonies
Population objectives	125,000 pairs breeding historically in this region of Quebec. Population currently increasing. Objective: maintain current trends (>3% increase/year) Currently 53,820 pairs
Monitoring objectives	Continue to monitor every 5 years
Research objectives	Estimate survival rates of adults Explore potential to establish as a breeding species in Gulf of Maine.
Habitat conservation objectives	Historically nested in southwest NS, and Bay of Fundy, NB but unrealistic at this time to set objective to restore these sites. One pair did nest in NB in last few years so possibility that restoration could occur naturally.
Focus area/site conservation objectives	Bonaventure Island QC Bird Rocks QC Migration through BCR

Species	American Bittern
Status	moderate priority for BCR 14 NAWCP - high concern Currently not at risk (COSEWIC) PiF - trend listed as 5 (declining)
Importance and Role of BCR-14	4% of NA breeding population Low responsibility in BCR 14 but listed as high concern continentally (NAWCP). Wide spread; responsibility may be spread across many BCRs each with small responsibility.
Conservation issues and threats in BCR-14	wetland loss; lack of information BBS shows declines (insignificant?) Anecdotal data suggests declines and range contractions
Population objectives	Maintain or increase number of breeding pairs
Monitoring objectives	Establish marsh-bird monitoring program to collect baseline abundance and distribution data and monitor long-term population trends; develop monitoring methods
Research objectives	Impacts of invasive species Impacts of water level management
Habitat conservation objectives	Protect wetland habitat
Focus area/site conservation objectives	Large wetlands (>10 acres)

Species	Black-crowned Night Heron
Status	high priority for BCR 14 NAWCP - moderate concern Not currently at risk
Importance and Role of BCR-14	10% of NA breeding population BCR 14: 5000 individuals NA: 50,000 individuals Moderate responsibility but no clear threats or declines.
Conservation issues and threats in BCR-14	Declining Canada-wide but increasing in QC Stable or increasing in NB (Inkerman MBS) Habitat destruction, limited breeding sites Persecution
Population objectives	Increase population – current BCR population estimate is 12,000; target population is 16,000-19,000
Monitoring objectives	Continue to monitor at Inkerman MBS
Research objectives	Establish whether they pose a threat to tern populations in BCR 14 via egg and chick predation
Habitat conservation objectives	Protect integrity of existing breeding and foraging habitat.
Focus area/site conservation objectives	Inkerman MBS & northeast NB St. Lawrence Island

Species	Yellow Rail
Status	Moderate priority for BCR 14 NAWCP - high concern COSEWIC Species of Special Concern Probably breeding on Gaspé; consistent breeding unlikely in ME, NB, NS, PEI
Importance and Role of BCR-14	Low BCR responsibility, high continental concern. NB and NS may provide important stop over habitat for a small number of birds
Conservation issues and threats in BCR-14	Wetland loss; lack of information
Population objectives	Objective still needed – need information on current population and status
Monitoring objectives	Establish marsh-bird monitoring programme; develop methods; determining current status and population size in BCR
Research objectives	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Black-legged Kittiwake
Status	moderate priority for BCR 14
Importance and Role of BCR-14	3.5% of NA breeding population NA population: 3 million individuals BCR population: 111,000 individuals Low BCR responsibility but declines in other portions of range
Conservation issues and threats in BCR-14	Declining in QC, as well as BCR 8 (North of BCR 14)
Population objectives	Maintain current population
Monitoring objectives	Continue regular monitoring (every 5 years) and establish new monitoring program at Cape Breton Island colonies and in Bay of Fundy
Research objectives	Breeding success
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Common Tern
Status	high priority for BCR 14 NAWCP - low concern Declines in PEI, NB, QC both in distribution and abundance
Importance and Role of BCR-14	19% of NA population Reasonably large proportion of continental population. Some debate whether this was A or B.
Conservation issues and threats in BCR-14	Population and colony declines; sensitive colonial nester Predation (gulls) Competition for nest sites (gulls) Changes in food availability Coastal development Concentrated population (Maine: 90% on 6 islands) Conservation dependent
Population objectives	Increase population size and number of colonies
Monitoring objectives	Regular monitoring required over wide areas (colonies move)
Research objectives	Breeding success and causes of low breeding success Determine association of commercial fisheries and climate change with food availability. Continue to research foraging habitat, migration rates and winter habitat use and distributions.
Habitat conservation objectives	Increase the number of historic and currently occupied nesting islands in conservation ownership. Restoration of historical sites including nest shelters, sign posting, seasonal closure of islands, etc.
Focus area/site conservation objectives	Magdalen Islands QC Kouchibouguac NP NB Tern Island (Tabusintac Bay) Country Island NS The Brothers NS MSI NB St. Lawrence Islands QC Poverty Beach PEI

Species	Arctic Tern
Status	high priority for BCR 14 NAWCP - high concern Maine - threatened
Importance and Role of BCR-14	1.9% of NA population Very clumped distribution in Maine Breeding and pelagic use of BCR 14
Conservation issues and threats in BCR-14	Population and colony declines; sensitive colonial nester Predation Competition for nest sites (gulls) Coastal development Changes in food availability.
Population objectives	Increase population size and number of colonies Slow population recovery compared to Common Terns and may even have declined.
Monitoring objectives	Regular monitoring required over wide areas (colonies move); intensive monitoring at large Machias Seal Island colony should continue
Research need	Estimate breeding success at selected locations on regular basis; continue intensive ecological and population research at Machias Seal Island.
Outreach needs	Seasonal closure of nesting islands, sign posting, education programs; develop partnerships with recreational and commercial users of coastal islands to educate them about colonial bird ecology and disturbance concerns
Habitat conservation objectives	Continue efforts to protect priority nesting islands through conservation ownership and restore historical sites.
Focus area/site conservation objectives	Machias Seal Island Magdalen Islands QC Gaspé Peninsula Country Island NS The Brothers NS

Species	Roseate Tern
Status	high priority for BCR 14 COSEWIC Endangered US Endangered
Importance and Role of BCR-14	10% of NE population (450-500 pairs) NE population ~4000 pairs NA population ~16,000 pairs Small proportion of NE population
Conservation issues and threats in BCR-14	Population & colony declines; sensitive colonial nester Predation Competition for nest sites (gulls) Coastal development
Population objectives	Increase population and number of colonies
Monitoring objectives	Regular monitoring required over wide areas (colonies move); continue intensive monitoring at Brothers Island, NS and Country Island
Research objectives	Identified in Recovery Strategy Continue to research foraging, habitat, migration routes, winter habitat use and distribution. Initiate research to determine association with commercial fisheries and climate change to food availability.
Habitat conservation objectives	Identified in Recovery Strategy Increase the number of historic nesting islands in conservation ownership.
Focus area/site conservation objectives	Country Island NS The Brothers NS Grassy Island NS Wedge Island NS (See Recovery Strategy)

Species	Atlantic Puffin
Status	moderate priority for BCR 14
Importance and Role of BCR-14	
Conservation issues and threats in BCR-14	
Population objectives	
Monitoring objectives	
Research objectives	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Black Guillemot
Status	high priority for BCR 14
Importance and Role of BCR-14	BCR population: 36,000 individuals NA population:150,000 individuals High BCR responsibility Breeding and pelagic use in BCR 14
Conservation issues and threats in BCR-14	Reduce threats from drowning in commercial fishing nets, contaminants, human disturbance and habitat loss.
Population objectives	Maintain current population
Monitoring objectives	Evaluate need to remove mammalian predators from nesting islands to enhance survival and recruitment rates.
Research objectives	
Habitat conservation objectives	Continue effort to protect priority nesting islands through conservation ownership.
Focus area/site conservation objectives	

Species	Herring Gull
Status	high priority for BCR 14
Importance and Role of BCR-14	8.3% of breeding population in BCR 14 Year round resident of BCR 14
Conservation issues and threats in BCR-14	Threats include: Land use changes; development Competition with Great Black-backed gulls Limited availability of suitable nesting sites Contaminants Reduction in food availability due to commercial fisheries.
Population objectives	Maintain population level
Monitoring objectives	Monitor abundance and distribution
Research objectives	Impacts of contaminants
Habitat conservation objectives	
Focus area/site conservation objectives	In local areas with seabird restoration, avoid overboard discharge of bait or fish waste that may increase gull feeding efforts and populations.

Species	Razorbill
Status	high priority for BCR 14 NAWCP - moderate concern Population is increasing recently Maine threatened
Importance and Role of BCR-14	22.5% of NA breeding population (mostly in QC) High proportion of continental population winters off Grand Manan
Conservation issues and threats in BCR-14	Bycatch (breeding colonies) Oil pollution (wintering)
Population objectives	Increase population
Monitoring objectives	More regular monitoring. Determine size of wintering population in Bay of Fundy
Research objectives	Determine colony origin of birds overwintering in Bay of Fundy Estimate adult survival
Habitat conservation objectives	Identify and prioritize islands with suitable nesting habitat and cultivate relationships with partners and landowners to facilitate management. Maintain seasonal closure of nesting habitats. By 2015, increase the number of Maine islands supporting Razorbills to eight, ensuring these islands are distributed between Penobscot Bay and downeast Maine.
Focus area/site conservation objectives	Machias Seal Island NB Pearl Island NS Bird Islands NS Wintering at mouth of Bay of Fundy around Grand Manan Island

Species	Horned Grebe
Status	moderate priority for BCR 14 Currently not at risk (COSEWIC)
Importance and Role of BCR-14	0.01% of NA breeding population (100-200,00 pairs) Small population on Magdalen Islands, which may be a discrete population, in which case BCR 14 has 100%. Concerns about small eastern winter population (Marshbird Plan - NAWCP 2). Also concern about wintering Red-necked Grebes for similar reason.
Conservation issues and threats in BCR-14	Human disturbance from recreational activities Oil pollution; winter population
Population objectives	Maintain current population
Monitoring objectives	Maintain monitoring under QC Species At Risk program; establish monitoring elsewhere; develop monitoring methods Conduct winter/ migration surveys
Research objectives	Determine genetic relatedness between eastern and western populations
Habitat conservation objectives	
Focus area/site conservation objectives	Magdalen Islands QC

Species	Greater Shearwater
Status	highest priority for BCR 14 NAWCP - high concern
Importance and Role of BCR-14	unknown but likely large segment of population spends time in BCR14 waters in summer
Conservation issues and threats in BCR-14	Reduce threats from oil spills, contaminants and incidental harvest/bycatch by commercial fisheries (longline). Lack of information (how many come through BCR 14?)
Population objectives	Maintain current population
Monitoring objectives	May be possible to monitor numbers through PIROP
Research objectives	Evaluate significance of mortality associated with bycatch from fisheries.
Habitat conservation objectives	
Focus area/site conservation objectives	Mouth of Bay of Fundy Scotian Shelf

Waterfowl Priority Species Data Sheets

Species	Canada Goose – North Atlantic Population
Status	Stable; BCR 14 High Priority
Importance and role of BCR-14	PEI – major stopover point for north and south migration Wintering from NB/NS south to SC – all along Atlantic coast Major migrant population of Canada geese associated with BCR Winter a minimum of 15K Est. winter population of 50K max.
Conservation issues and threats in BCR-14	Harvest management Deterioration of eel grass flats in NB/NS Habitat protection – need more info. on dist. Possible impacts of rapid aquaculture expansion – disturbance Mixing with resident Canada geese
Population objectives	Defer to NAWMP – in planning stages Have a population survey – annual numbers of at least 100,000 individuals pass through this BCR – need to sustain this population
Monitoring needs	Survey of staging and wintering areas CWS cooperates with PEI on mid-November survey Continue banding in PEI in the spring Improvement of aging techniques Sex and age survey in the harvest
Research needs	Determine impacts of aquaculture Investigate eel grass declines
Outreach needs	Resident vs. Migrant Canada goose – issue with farmers and yuppies
Habitat conservation objectives	Secure major wintering areas and conserve habitat quality in staging areas. Merrymeeting Bay and Scarborough Marsh significant historical stopover site in fall and spring migration On PEI, continue forms of agriculture beneficial to this population
Focus area/site conservation objectives	

Species	Resident Canada Goose
Status	Increasing and expanding; BCR 14 Management Concern
Importance and role of BCR-14	Defer to Resident Canada goose plan
Conservation issues and threats in BCR-14	Harvest management opportunities limited. Mixing with NAP Canada geese confounds management for both populations. Property damage Human health and safety issues EIS in development in the U.S.
Population objectives	Above population objectives in BCR 14 Atlantic Flyway goals suggest a density of 0.5 geese/square mile for this region
Monitoring needs	Canadian breeding pair survey Canadian banding program
Research needs	Effective control and deterrence
Outreach needs	See above
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Greater Snow Goose
Status	Recent decline but long-term increase; BCR 14 Management Concern
Importance and role of BCR-14	Spring and fall staging in St. Lawrence estuary
Conservation issues and threats in BCR-14	Spring conservation hunt (overabundant species) Damage to tidal flats and agricultural crops. EIS in U.S. addressing the issue – not complete.
Population objectives	500,000 in spring – defer to plan Current population @ 640,000
Monitoring needs	Maintain current system – photo survey
Research needs	Determine optimum population numbers.
Outreach needs	Concern with opposing conservation objectives with hunters and bird watchers vs. farmers.
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	Atlantic Brant
Status	Stable; BCR 14 Moderate Priority
Importance and role of BCR-14	Spring staging Fall migration in the U.S. also spring staging
Conservation issues and threats in BCR-14	Species of management concern Can be overharvested Dependent on breeding conditions – production failures and can be hurt south of BCR Know how to manage the harvest Management Plan in Atlantic Flyway
Population objectives	Defer to plan
Monitoring needs	Defer to plan
Research needs	
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	

Species	American Black Duck
Status	Stable or increasing; BCR 14 Highest Priority
Importance and role of BCR-14	Maintains a significant proportion of the NA population during breeding, migration, and wintering
Conservation issues and threats in BCR-14	Possible displacement by mallards; deterioration of wintering habitat; competitive uses for coastal habitat – conflict with aquaculture; sea level rise and salt marsh containment due to existing infrastructure; disturbance and habitat quality effects of surrounding land use
Population objectives	As determined by NSST; until NSST develops objectives, could be based on available habitat area
Monitoring needs	To extend Black Duck survey plot surveys throughout the BCR (big gaps exist in helicopter and fixed-winged survey) for wintering populations; Breeding ground survey from the ground in Quebec along the coast
Research needs	Subject to gaps in Conroy's Black Duck model No habitat relationship in population model – should be looked into further Sauer's research to combine fixed-winged and helicopter survey programs into an improved estimate with less variance
Outreach needs	BDJV developing a communication plan; public education about the effects on wild populations of releasing captive-reared mallards
Habitat conservation objectives	Maintain current habitat mix; habitat is likely not a limiting factor for this species in BCR 14
Focus area/site conservation objectives	Peatlands in northern part of BCR are important and threatened by peat extraction; intertidal wetlands quality and quantity

Species	Mallard
Status	Increasing; BCR 14 Management Concern
Importance and role of BCR-14	Provides unexploited habitat for future expansion
Conservation issues and threats in BCR-14	Competition with Black Ducks
Population objectives	Defer to eastern mallard model; although the model currently seeks to maintain max. sustainable harvest, which may not be a level that is low enough to reduce competition problems with Black Ducks
Monitoring needs	Maintain existing program – expand to cover remainder of BCR
Research needs	As per Conray model
Outreach needs	Make public more aware to Black Duck/Mallard conflict
Habitat conservation objectives	None
Focus area/site conservation objectives	

Species	Wood Duck
Status	Suspected stable; BCR 14 Moderate Priority
Importance and role of BCR-14	Breeding and migration – northern extent of range
Conservation issues and threats in BCR-14	Northern extent of range Harvest issues during liberal seasons Tree nesting species – may be competing with hooded mergansers in this region
Population objectives	Undetermined ;
Monitoring needs	Lack region-wide population survey; based on plot surveys in NY, VT, and NH, current population is at a similar level to mallards in those states
Research needs	Impact of forest practices
Outreach needs	
Habitat conservation objectives	Conserve nesting cavities on breeding grounds
Focus area/site conservation objectives	Hardwood riparian zones

Species	Common Goldeneye
Status	Suspected decline; BCR 14 Moderate Priority
Importance and role of BCR-14	Breeding, migration and wintering for unknown % of population
Conservation issues and threats in BCR-14	Impacts of forestry Overlap with aquaculture industry Harvest impact unknown Barrows/Common identification issue
Population objectives	Undetermined – should at least maintain current numbers
Monitoring needs	Lack both breeding and wintering surveys Improved harvest survey
Research needs	Population delineation
Outreach needs	Barrows identification Forest industry and management for cavity trees
Habitat conservation objectives	Maintain cavity sites on breeding grounds and adequate wintering grounds
Focus area/site conservation objectives	Hardwood riparian areas for breeding (nest cavities) and shallow coastal areas for migration and wintering

Species	Greater Scaup
Status	Suspected stable; BCR 14 Moderate Priority
Importance and role of BCR-14	Quebec and New Brunswick breeding areas Small wintering population
Conservation issues and threats in BCR-14	Describe nesting habitat in Quebec and potential for habitat protection Possible habitat manipulation in New Brunswick Aquaculture and contaminant issues on wintering grounds Numbers wintering in Maine have declined significantly over last 30 years
Population objectives	None
Monitoring needs	Lack good population survey Need banding program Need better harvest data
Research needs	Low priority Mussel aquaculture Contaminant loading
Outreach needs	Maybe do advisories to hunters pertaining to contaminant loading
Habitat conservation objectives	Protection of coastal wintering areas Determine if Quebec breeding sites need protection
Focus area/site conservation objectives	

Species	Common Eider (<i>dresseri</i>)
Status	Wintering populations appear to be stable or slightly increasing; BCR 14 Highest Priority
Importance and role of BCR-14	Maintains a significant proportion of the NA <i>dresseri</i> population during breeding, migration and staging, molting, wintering
Conservation issues and threats in BCR-14	Threats include: Impacts to breeding colonies through island development Ecotourism Aquaculture Oil spills Potential over-harvest Economic issue related to down harvest Cholera in breeding colonies Predation of ducklings
Population objectives	120,000 breeding pairs
Monitoring needs	Coordinated surveys of breeding colonies Monitoring of molting groups Improved harvest surveys Maintain and expand banding programs for age and sex groups to develop survival estimates
Research needs	Population model Effects of aquaculture on behavior and distribution Predation rates on ducklings
Outreach needs	Build liaison with outfitters regarding harvest
Habitat conservation objectives	Protection of nesting islands, brood rearing, molting and feeding areas
Focus area/site conservation objectives	Islands in Bay of Fundy (breeding) Atlantic coast of Nova Scotia (breeding, molting, and staging) St. Lawrence mid and lower estuary (breeding) Concentration areas in coastal Maine

Species	Barrows Goldeneye
Status	Stable or decreasing; in Canada listed as species of concern; BCR 14 Highest Priority
Importance and role of BCR-14	Wintering Population throughout coastal portions of BCR.
Conservation issues and threats in BCR-14	Oil spills, aquaculture activities displacing foraging areas Over harvest of discrete wintering populations
Population objectives	TBD
Monitoring needs	Initiate regular surveys of wintering birds
Research needs	Impacts of aquaculture industry activities on key winter and feeding areas, wintering ecology
Outreach needs	Identification conflict with common goldeneyes, develop outreach material to help differentiate between them.
Habitat conservation objectives	Maintain key wintering areas from competing uses (e.g., development) and from human disturbance.
Focus area/site conservation objectives	Dalhousie, NB; 4 key areas in PEI; scattered sites in NB and NS; northern sector of mid and lower St. Lawrence estuary; 4 sites in Maine and possibly Lake Champlain

Species	Long-tailed Duck
Status	Gradual decline or stable based on limited data; BCR 14 Moderate Priority
Importance and role of BCR-14	Wintering
Conservation issues and threats in BCR-14	Lack of knowledge Oil spills Aquaculture conflicts
Population objectives	None
Monitoring needs	Develop winter survey Improve harvest survey
Research needs	Population delineation – need base line information Need more info on wintering ecology
Outreach needs	
Habitat conservation objectives	
Focus area/site conservation objectives	Coastal aquaculture sites

Species	Eastern Harlequin Duck
Status	Increasing but in Canada listed as species of special concern and threatened in Maine; BCR 14 Highest Priority
Importance and role of BCR-14	Wintering 90% of eastern NA wintering population (rest of eastern NA wintering population winter in Greenland)
Conservation issues and threats in BCR-14	Threat by oil spills; threats by aquaculture on wintering grounds, threats of low fecundity rates and high rates of non-breeding in female harlequin, minimize activities such as dragging for shellfish and disturbance from waterfowl hunters that disrupt harlequin feeding activities.
Population objectives	TBD – management plan being written
Monitoring needs	Survey wintering areas; identification of additional molting areas and coastwide surveys.
Research needs	Evaluation of aquaculture impacts Winter ecology Relationship between Canadian and Greenland populations.
Outreach needs	Maintain current programs
Habitat conservation objectives	Secure key wintering areas in Bay of Fundy and Atlantic coast of Nova Scotia
Focus area/site conservation objectives	Secure key wintering areas in Bay of Fundy and Atlantic coast of Nova Scotia Offshore areas from Newport to Port Daniel, Rocher Perce and Forillon Secure key wintering areas in Maine

Species	Black Scoter
Status	Believed to be Declining; BCR 14 High Priority
Importance and role of BCR-14	Bay of Chaleur stages all of spring migrating birds in Atlantic Flyway Small portion of flyway population winter in BCR
Conservation issues and threats in BCR-14	Reduce threats from: Contaminants in feeding areas Oil spills Lack of knowledge
Population objectives	TBD
Monitoring needs	Migration and staging surveys; better harvest surveys;
Research needs	Population delineation Examination of foraging and feeding behavior Quality and quantity of feeding areas Contaminant loading in prey species Population model Improve data collection from hunters.
Outreach needs	Develop outreach material to educate the public about the value of habitat used during migration.
Habitat conservation objectives	Secure key spring staging areas;
Focus area/site conservation objectives	Bay of Chaleur Northern coast of St. Lawrence lower estuary

Species	Surf Scoter
Status	Trend believed to be decreasing - limited data; BCR 14 Moderate Priority
Importance and role of BCR-14	Spring staging in St. Lawrence estuary, molting
Conservation issues and threats in BCR-14	Population delineation Oil spills Contaminants in food source Aquaculture
Population objectives	TBD
Monitoring needs	Surveys of staging and molting areas Banding of molting birds to develop survival estimates
Research needs	Population delineation; measure impacts of contaminants Evaluation of impacts of aquaculture on staging and molting areas Population model
Outreach needs	Value of migration habitat
Habitat conservation objectives	Secure key staging and molting areas;
Focus area/site conservation objectives	Northern coast of St. Lawrence lower estuary

Appendix D. Priority species-habitat suites for BCR 14. Highest Priority species are in bold, High Priority species are in regular type, Moderate Priority species are in italics, and Species of Management Concern are in underlined italics. Hyperlinks in this appendix go to the corresponding section in Appendix E - the detailed summary of conservation recommendations and objectives from existing bird plans.

COASTAL				
Habitat Type	Landbirds	Shorebirds	Waterbirds	Waterfowl
Marine Open Water nearshore and offshore		Red-necked Phalarope Red Phalarope	Greater Shearwater Arctic Tern Black Guillemot Northern Gannet Red-necked Grebe Razorbill Red Phalarope <i>Atlantic Puffin</i> <i>Black-legged Kittiwake</i> <i>Common Loon</i> <i>Red-throated Loon</i>	Common Eider <i>Long-tailed Duck</i>
Estuaries and Bays		Red-necked Phalarope	Great Cormorant Common Tern Herring Gull Red Phalarope Roseate Tern Red-necked Grebe <i>Horned Grebe</i> <i>Common Loon</i> <i>Red-throated Loon</i>	Barrow's Goldeneye American Black Duck Common Eider Black Scoter Canada Goose-NAP <i>Atlantic Brant</i> <i>Common Goldeneye</i> <i>Surf Scoter</i> <i>Greater Scaup</i> <i>Long-tailed Duck</i>
Rocky Coastline including islands and cliffs		Purple Sandpiper Semipalmated Sandpiper Ruddy Turnstone	Great Cormorant Arctic Tern Black Guillemot Northern Gannet Razorbill Common Tern Herring Gull Roseate Tern <i>Atlantic Puffin</i> <i>Leach's Storm-petrel</i>	Common Eider Harlequin Duck

Unconsolidated Shore (beach, sand, mudflats)		Piping Plover Semipalmated Sandpiper American Golden-Plover Black-bellied Plover Red Knot Ruddy Turnstone Short-billed Dowitcher Whimbrel <i>American Oystercatcher</i> <i>Hudsonian Godwit</i> <i>Least Sandpiper</i> <i>Sanderling</i> <i>Semipalmated Plover</i> <i>Willet</i>	Herring Gull	
Estuarine Emergent Saltmarsh	Nelson's Sharp-tailed Sparrow <i>Short-eared Owl</i>	Short-billed Dowitcher Whimbrel <i>Hudsonian Godwit</i> <i>Least Sandpiper</i> <i>Willet</i>	Black-crowned Night Heron	American Black Duck <i>Mallard</i> <i>Greater Snow Goose</i>
FRESHWATER				
Habitat Type	Landbirds	Shorebirds	Waterbirds	Waterfowl
Freshwater Lakes, Rivers, and Streams	<i>Bald Eagle</i> <i>Bank Swallow</i>		Common Tern Herring Gull <i>Common Loon</i>	American Black Duck Harlequin Duck Barrow's Goldeneye Common Goldeneye <i>Wood Duck</i> <i>Resident Canada Goose</i>
Palustrine Emergent Marsh	<i>Barn Swallow</i> <i>Northern Harrier</i> <i>Short-eared Owl</i>	<i>Wilson's Snipe</i> <i>Least Sandpiper</i>	Black-crowned Night Heron <i>American Bittern</i> <i>Yellow Rail</i>	American Black Duck <i>Wood Duck</i>
Forested Wetland	Rusty Blackbird		Black-crowned Nigh Heron	American Black Duck Common Goldeneye <i>Wood Duck</i>
Shrub-scrub,	Canada Warbler	American Woodcock		

including bogs

Olive-sided Flycatcher
Rusty Blackbird
Palm Warbler
Yellow-bellied Flycatcher

UPLANDS

Habitat Type	Landbirds	Shorebirds	Waterbirds	Waterfowl
Deciduous and Mixed Forest	Canada Warbler Wood Thrush American Redstart Black-throated Blue Warbler Chimney Swift Eastern Wood-Pewee Veery Yellow-bellied Sapsucker <i>Black-billed Cuckoo</i> <i>Northern Flicker</i> <i>Ovenbird</i> <i>Rose-breasted Grosbeak</i> <i>Ruffed Grouse</i> <i>Whip-poor-will</i>			
Coniferous Forest	Bay-breasted Warbler Canada Warbler Boreal Chickadee Cape May Warbler Long-eared Owl Olive-sided Flycatcher Purple Finch <i>Black-backed Woodpecker</i> <i>Blackburnian Warbler</i> <i>Blackpoll Warbler</i> <i>Black-throated Green Warbler</i> <i>Boreal Owl</i> <i>Brown Creeper</i> <i>Gray Jay</i> <i>Northern Goshawk</i> <i>Northern Parula</i> <i>Pine Grosbeak</i>			

Yellow-bellied Flycatcher

Mixed Forest	Canada Warbler Wood Thrush American Redstart Black-throated Blue Warbler Long-eared Owl Olive-sided Flycatcher Purple Finch Veery <i>Blackburnian Warbler</i> <i>Black-throated Green Warbler</i> Boreal Owl Brown Creeper Northern Flicker Northern Goshawk Northern Parula Ovenbird Ruffed Grouse		
Mountaintop Forest	Bicknell's Thrush Purple Finch Blackpoll Warbler		
Shrub / Early Successional	Blue-winged Warbler Chestnut-sided Warbler Olive-sided Flycatcher <i>Whip-poor-will</i> <i>Palm Warbler</i> <i>Ruffed Grouse</i>	American Woodcock	
Grasslands / Agriculture	Ipswich Savannah Sparrow Bobolink <i>Barn Swallow</i> <i>Horned Lark</i> <i>Northern Harrier</i> <i>Short-eared Owl</i> <i>Vesper Sparrow</i>	American Woodcock American Golden-Plover Black-bellied Plover Upland Sandpiper <i>Killdeer</i> <i>Willet</i> <i>Wilson's Snipe</i>	Canada Goose-NAP <u>Resident Canada Goose</u> <u>Greater Snow Goose</u>

[Urban/Suburban](#)

Chimney Swift
Common Nighthawk
Barn Swallow

Killdeer

Appendix E, Part 1. Issues, Goals, Objectives, and Implementation Strategies by Habitat and Focal Species for BCR 14.

The information in this appendix was compiled by Linda Welch, Refuge Biologist at Petit Manan National Wildlife Refuge in Maine, as part of a process to help organize information available from existing bird conservation plans for use in the state of Maine's comprehensive wildlife conservation planning process. Much of the same information is applicable to the entire BCR, and so the document that Linda produced is included here, with minor revisions to help make the document useable at the BCR level. Information specific to Maine is still included in this draft, as we felt it would be useful to others in the BCR. Information from other jurisdictions could be incorporated in future versions of this appendix.

General Note: Conserving and restoring populations goes hand in hand with conserving and restoring habitat. Each habitat is presented with a broad conservation goal, followed by broad objectives, with focal species objectives, and if available research and outreach needs. It is our intention to provide the most current data available regarding population and habitat objectives where it is feasible. However, we recognize individual jurisdictions may have more specific information about some species and habitats or may consider the current objectives to be too speculative at this time to be useful. The population and habitat objectives are provided as suggestions for those who find this kind of information useful but are not intended to preclude other means of establishing objectives. We hope this document will provide a framework for incorporating more additional information as it becomes available.

Fifteen priority habitats are covered in this appendix:

HABITATS		
<u>Coastal</u>	<u>Freshwater Wetlands</u>	<u>Upland</u>
<u>Marine Open Water</u>	<u>Freshwater Lakes, Rivers, and Streams</u>	<u>Deciduous and Mixed Forest</u>
<u>Estuaries and Bays</u>	<u>Palustrine Emergent Marsh</u>	<u>Coniferous Forest</u>
<u>Rocky Coastline</u> , including islands and cliffs	<u>Forested Wetland</u>	<u>Mountaintop Forest</u>
<u>Unconsolidated Shore</u> (beaches and mudflats)	<u>Shrub-scrub Wetland</u> , including bogs	<u>Shrub / Early Successional Habitat</u>
<u>Estuarine Emergent Saltmarsh</u>		<u>Grasslands / Agricultural Fields</u>
		<u>Urban / Suburban</u>

For each of the three major habitat types (coastal, freshwater wetlands, and uplands) we have presented a single table with all of the associated priority species which utilize that habitat type. We have followed this with specific lists goals and objectives for each of the 15 priority habitat types and a selected set of associated focal species, which are intended to represent the needs of the entire suite of species using that habitat type. The species tables list the priority species for BCR 14, their priority ranking (Highest priority =1, High priority = 2, and Moderate priority = 3), and primary season/s of occurrence (B=breeding, M=migrating, W=wintering).

Coastal

Associated priority species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Black Duck	1	X		X	Hudsonian Godwit	3		X	
American Golden Plover	2		X		Leach's Storm Petrel	3	X		
American Oystercatcher	3	X			Least Sandpiper	3		X	
Arctic Tern	2	X			Long-tailed Duck	3			X
Atlantic Brant	3		X		Nelson's Sharp-tailed Sparrow	1	X		
Atlantic Puffin	3	X		X	Northern Gannet	2			
Bald Eagle	3	X		X	Piping Plover	1	X		
Barrow's Goldeneye	1			X	Purple Sandpiper	1			X
Black Guillemot	2	X		X	Razorbill	2	X		X
Black Scoter	2			X	Red Knot	2		X	
Black-bellied Plover	2		X		Red Phalarope	2		X	
Black-crowned Night Heron	2	X			Red-necked Grebe	2			X
Black-legged Kittiwake	3			X	Red-necked Phalarope	1		X	
Canada Goose –NAP	2		X		Red-throated Loon	3			X
Common Eider	1	X		X	Roseate Tern	2	X		
Common Goldeneye	3	X		X	Ruddy Turnstone	2		X	
Common Loon	3	X		X	Sanderling	3		X	
Common Tern	2	X			Semipalmated Plover	3		X	
Great Cormorant	1	X		X	Semipalmated Sandpiper	1		X	
Greater Scaup	3			X	Short-billed Dowitcher	2		X	
Greater Shearwater	1		X		Short-eared Owl	3	X	X	
Harlequin Duck	1			X	Surf Scoter	3			X
Herring Gull	2	X		X	Whimbrel	2		X	
Horned Grebe	3			X	Willet	3		X	

Marine Open Water (nearshore and offshore)

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
Arctic Tern	2	X			Northern Gannet	2			
Black Guillemot	2	X		X	Razorbill	2	X		X
Common Eider	1	X		X	Red Phalarope	2		X	
Greater Shearwater	1		X		Red-necked Phalarope	1		X	

Issues:

Threats:

- Climate change/sea level rising
- Oil spills /contamination
- Disease
- Prey availability (?)
- Entanglement (fishing lines and nets)

Goal:

Conserve, restore and enhance populations of focal species in coastal habitat to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. Protect and maintain high priority habitats.

Strategy	Task
Identify high priority habitats.	• Conduct surveys to determine significant wintering, foraging, molting, and staging areas.

2. Maintain or enhance populations of focal species.

Strategy	Task
Monitor breeding and non-breeding populations of focal species to determine population size, status, and trends.	• Monitor death & morbidity of seabirds.

	• Identify & monitor important foraging, wintering, and migrating areas. • Develop and implement strategy to monitor colonial birds. • Increase monitoring of seabird bycatch. • Determine population level effects of oil and hazardous materials on birds. • Study the role of commercial fisheries in seabird mortality. • Assess role of commercial fisheries on prey availability • Implement surveys to determine population size of all species.
Decrease human disturbance/threats.	• Develop partnerships with fishery industries and commercial tour boat operators. • Partner with fishery planners to include reduced seabird mortality strategies in all future plans. • Implement increased enforcement of shipping activities, safe operational procedures, spill clean-up, and rehabilitation of oiled birds. • Prohibit and enforce dumping of debris, lines, and nets. • Develop non-persistent lines, nets and traps.

Specific Objectives for Focal Species:

Species	Status & Distribution	Habitat/Management Objectives	Research, Monitoring, & Outreach Objectives
Arctic Tern	See Islands habitat section for specific objectives for this species		
Black Guillemot	See Islands habitat section for specific objectives for this species		
Common Eider	See Islands habitat section for specific objectives for this species		
Greater Shearwater	Status and distribution unknown, but large segment of population may spend time in BCR14 waters during summer. Non-breeding visitor between March - August	Reduce threats from oil spills, contaminants, and incidental harvest by commercial fisheries (bycatch). Focus sites may include Mouth of Bay of Fundy and the Scotian Shelf.	• Develop monitoring protocols • Evaluate significance of mortality associated with bycatch from fisheries
Northern Gannet	• 69% of NA population breeds at two colonies in Quebec; migrates through rest of BCR • 125,000 breeding pairs historically in QC. • Population increasing in	Reduce threats from oil spills, contaminants, incidental harvest by commercial fisheries (bycatch), and human disturbance/persecution Populations are concentrated in two large colonies.	• Estimate adult survival rates (BCR 14 Workshop) • Continue to monitor every 5 years • Explore potential to establish as breeding species in Gulf of Maine (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research, Monitoring, & Outreach Objectives
	BCR; current estimate of 53,820 pairs; maintain current population trends (>3% increase/ year).	Historically nested in southwest NS, and Bay of Fundy, NB but unrealistic at this time to set any habitat objectives to restore these sites. One pair did nest in NB in last few years so it may be possible that restoration could occur naturally. Focus sites include Bonaventure Island QC, Bird Rock QC, and migration through the BCR.	
Razorbill	See Islands habitat section for specific objectives for this species		
Red Phalarope	Bay of Fundy represents an important staging area Red Phalaropes (ca. 20,000) used area off Brier Island in NS in 1982	Reduce threats from declining food availability, oil spills, predation, and storm events	Ask International Shorebird Group to identify Phalaropes as a focal species (BCR 14 Workshop) Develop habitat suitability model and survey target areas to determine if birds have moved elsewhere. (BCR 14 Workshop)
Red-necked Phalarope	Until the early 1980's, large concentrations of birds (up to 1,000,000+) were observed near in the Quoddy Region and between Deer Island and Campobello Island. These birds largely disappeared after 1986. Recent surveys have documented fewer than 1,000 birds in Maine. Reason for decline is unknown.	Reduce threats from declining food availability, oil spills, predation, and storm events	Ask International Shorebird Group to identify Phalaropes as a focal species (BCR 14 Workshop) Research is needed on availability of marine plankton within Quoddy. Repeat only systematic survey of prey done previously in Deer/Campobello Island area. (BCR 14 Workshop) Bring together all information on abundance and distribution of birds in Quoddy Region. Develop habitat suitability model and survey target areas to determine if birds have moved elsewhere. (BCR 14 Workshop)

Estuaries and Bays

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Black Duck	1	X		X	Common Tern	2	X		
Barrow's Goldeneye	1			X	Great Cormorant	1	X		X
Black Scoter	2			X	Red-necked Grebe	2			X
Canada Goose –NAP	2		X		Roseate Tern	2	X		
Common Eider	1	X		X					

Issues:

Need to protect upland buffer surrounding the estuaries and bays to maintain habitat quality and minimize disturbance. Several key locations are located at the mouth of rivers receiving significant industrial discharge. Need to monitor invasive species to make sure they do not become serious threat

Threats:

- Habitat loss, through development and erosion
- Human disturbance
- Oil spills / Contaminants

Goal:

Conserve, restore and enhance populations of focal species which utilize estuaries and bays to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. *Protect and maintain high priority habitats.*

Strategy	Task
Identify high priority habitats.	• Initiate standardized coast-wide surveys to determine key molting, wintering, and staging areas • Identify and map high priority areas for focal species

2. *Maintain or enhance populations of focal species.*

Strategy	Task
Monitor breeding and non-breeding populations of focal species to determine population size, status, and trends.	• Monitor death & morbidity of seabirds and waterbirds. • Identify & monitor important foraging, wintering, and migrating areas. • Develop and implement strategy to monitor colonial birds. • Increase monitoring of seabird bycatch and role of commercial fisheries on seabird mortality. • Determine population level effects of oil and hazardous materials on birds. • Assess role of commercial fisheries on prey availability • Implement surveys to determine population size of all species.
Decrease human disturbance/threats.	• Develop partnerships with fishery industries and commercial tour boat operators. • Partner with fishery planners to include reduced seabird mortality strategies in all future plans. • Implement increased enforcement of shipping activities, safe operational procedures, spill clean-up, and rehabilitation of oiled birds. • Prohibit and enforce dumping of debris, lines, and nets. • Develop non-persistent lines, nets and traps.

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Black Duck (Wintering Population)	BCR supports a significant proportion of the NA population during breeding, migration, and wintering; BCR population is currently stable or increasing	Reduce threats from: competition with Mallards, degradation of wintering habitat, human disturbance, habitat loss and degradation, aquaculture, sea level rise, and contaminants. (BCR 14 workshop) Need to protect inter-tidal wetlands from degradation and focus on important peatlands in northern part of BCR that are threatened by peat extraction. (BCR 14 workshop) Maintain current habitat mix; habitat is likely not a limiting factor for this species in BCR 14.	Maintain or increase as necessary existing monitoring efforts of wintering population (BCR 14 Workshop) Expand population model to include habitat characteristics (BCR 14 Workshop) Expand survey efforts throughout BCR to cover areas currently not included in aerial surveys (BCR 14 Workshop) BDJV developing a communication plan; public education about the effects on wild populations of releasing captive-reared mallards.

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
Barrow's Goldeneye	Winters throughout coastal portions of BCR; listed as species of concern in Canada. BCR wintering population stable or decreasing Maine population estimated at 150 individuals at 5-6 locations	Reduce threats from: oil spills, displacement from foraging areas by aquaculture development, over harvest Maintain key wintering areas from development and disturbance (BCR 14 Workshop)	Initiate routine surveys of wintering birds (BCR 14 Workshop) Initiate research on wintering ecology of the species, and potential effects of aquaculture development on traditional feeding habitat (BCR 14 Workshop) Develop outreach material to help differentiate between barrow's and common goldeneye (BCR 14 Workshop)
Black Scoter	Bay of Chaleur stages all of spring migrating birds in Atlantic Flyway; small portion of flyway population winters in BCR Believed to be declining	Reduce threats from: oil spills, contaminants, and overall lack of knowledge on the species Protect critical spring staging areas (BCR 14 Workshop) Focus sites may include Bay of Chaleur and Northern coast of St. Lawrence lower estuary.	Initiate surveys of migration and staging areas (BCR 14 Workshop) Improve data collection from hunters (BCR 14 Workshop) Initiate research on foraging behavior and ecology, contaminant levels in prey items, distribution and quality of feeding areas, and develop a population model (BCR 14 Workshop) Develop outreach material to educate public about value of habitat used during migration (BCR 14 Workshop)
Canada Goose – NAP	See Grasslands / Agriculture habitat section for specific objectives for this species		

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
Common Eider (Molting and Wintering Birds)	Maintains a significant proportion of the NA <i>dresseri</i> population during breeding, migration and staging, molting, wintering Stable or slightly increasing population trend in BCR <u>Population Objective:</u> 120,000 breeding pairs (BCR 14 Workshop)	Threats: habitat loss, principle dietary items have high commercial value, human disturbance, potential over-harvest, aquaculture development, high susceptibility to disturbance and oil spills during molt period Habitat conservation efforts should include nesting islands, brood rearing habitat, molting and feeding areas (BCR 14 Workshop)	Document seasonal distribution of eiders significant, particularly brood rearing and molting areas (Atlantic Coast Sea Duck Workshop / BCR 14 Workshop) Initiate research to evaluate significance of commercial harvesting of resources from eider molting and wintering habitats (MDIFW Species Assessment and Atlantic Coast Sea Duck Workshop) In cooperation with partners, develop an outreach program to promote an understanding and appreciation of eiders and their habitat requirements in Maine (MDIFW Species Assessment) Improve collection of information from hunters, including level of take and age / sex ratios. Work with outfitters to improve reporting efforts. (Atlantic Coast Sea Duck Workshop / BCR 14 Workshop) Monitor effects of commercial aquaculture development on distribution and feeding rates of eiders (BCR 14 Workshop)
	See Islands habitat section for Breeding Common Eider Habitat Objectives		
Common Tern	See Islands habitat section for specific objectives for this species		
Great Cormorant	See Islands habitat section for specific objectives for this species		
Red-necked Grebe	Wintering and migrating use of BCR Eastern population ranges 15-20% (wintering); NA population ranges 55,000-	Reduce threats from oil spills, contaminants, and by-catch in commercial fisheries Need to minimize exposure to oil pollution during winter months (BCR 14 Workshop)	Develop methods and conduct surveys of migrating and wintering birds (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	70,000 pairs. <u>Population Objective:</u> Maintain current population (Marshbird Plan [NAWCP 2]); currently not at risk. (COSEWIC, NAWCP)		Need to determine genetic relatedness between eastern and western populations (BCR 14 Workshop)
Roseate Tern	See Islands habitat section for specific objectives for this species		

Rocky Coastline, including Islands and Cliffs

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
Arctic Tern	2	X			Northern Gannet	2	X	X	
Black Guillemot	2	X		X	Purple Sandpiper	1			X
Common Eider	1	X		X	Razorbill	2	X		X
Common Tern	2	X			Roseate Tern	2	X		
Great Cormorant	1	X		X	Ruddy Turnstone	2		X	
Harlequin Duck	1			X	Semipalmated Sandpiper	1		X	
Herring Gull	2	X		X					

Issues:

Need to protect additional islands

Lack of funding for surveys, island acquisition, and new restoration projects

Threats:

- Predation, particularly from Great black-backed and Herring Gulls
- Habitat loss, through development and erosion
- Food availability
- Aquaculture development
- Human disturbance
- Contaminants

Goal:

Conserve, restore and enhance populations of focal species which utilize the BCR's rocky coastline, islands, and cliffs to ensure the overall conservation of all native species within this habitat.

General Objectives:*1. Protect and maintain high priority habitats.*

Strategy	Task
Identify high priority habitats.	• Evaluate areas of rocky coastline and all coastal islands and cliffs for current or historic use by seabirds. (This has been done in Maine for all 3,500 coastal islands) • Identify priority islands, cliffs, and coastline areas for target protect and conservation actions.
Protect high priority habitats	• Protect seabird nesting islands and adjacent waters from further development, especially human dwellings, fishing piers, docks, and aquaculture facilities (Maine E&T Handbook) • Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important seabird nesting habitat (Maine E&T Handbook) • Avoid overfishing and polluting nursery areas for herring, hake, and other fish stocks important as food for seabirds (Maine E&T Handbook) • Do not use gill nests near seabird nesting islands or known feeding area (Maine E&T Handbook)
Plan for oil spill response.	• Continue Spill Response efforts and planning, including purchasing survey and hazing equipment (N. Atlantic Regional Shorebird Plan, MDIFW Oil Spill Response Plan) • Identify and map significant habitat for nesting, migratory, and wintering species • Document habitat quality and food resources prior to spill to serve as baseline for assessing direct and indirect effects of spills (N. Atlantic Regional Shorebird Plan) • Implement post spill surveys to accurately quantify spill damages. • Effects on birds should be minimized by increase enforcement of shipping activities, safe operational procedures, spill clean up and rehabilitation of oiled birds.

2. Maintain or enhance populations of focal species.

Monitor breeding and non-breeding populations of focal	• Continue surveying seabird nesting islands, including the Gulf of Maine Seabird
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species to determine population size, status, and trends.	Working Group census window and similar efforts in Canada. • Monitor death & morbidity of seabirds. • Identify & monitor important foraging, roosting, loafing, and migrating areas. • Develop and implement strategy to monitor colonial birds. • Increase monitoring of seabird bycatch. • Determine population level effects of oil and hazardous materials on birds. • Study the role of commercial fisheries in seabird mortality. • Assess role of commercial fisheries on prey availability • Implement surveys to determine population size of all species.
Decrease human disturbance/threats.	• Maintain seasonal closures on all seabird nesting islands. For example, Maine maintain closures from April 1 – July 31 (eider and gull islands) or August 15 (alcid and tern islands) (Maine E&T Handbook) • Keep aquaculture facilities more than ¼ mile from seabird nesting islands (Maine E&T Handbook) • Keep boat activity more than 600' from seabird nesting islands (Maine E&T Handbook) • Keep all pets off islands and do not introduce mammalian predators (Maine E&T Handbook) • Develop partnerships with fishery industries and commercial tour boat operators. • Develop partnerships with recreational and commercial users of coastal islands to educate them about seabird ecology and disturbance concerns • Partner with fishery planners to include reduced seabird mortality strategies in all future plans. • Implement increased enforcement of shipping activities, safe operational procedures, spill clean-up, and rehabilitation of oiled birds. • Prohibit and enforce dumping of debris, lines, and nets. • Develop non-persistent lines, nets and traps.

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
Arctic Tern	• BCR population estimate of 19,100 breeding birds; regional breeding population increasing	Threats include: predation from gulls, habitat loss, competition for nesting sites with gulls, changes in food availability, and limited number and distribution of colonies	Continue to research foraging habitat, migration routes, winter habitat use and distribution (USFWS Tern Plan)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	(MANEM waterbird species profile) • breeding and pelagic use Slow population recovery compared to Common Terns and may even have declined.	Successful management techniques at nesting islands include: • Restoration of historical sites using social attraction, vegetation control, predator control, nest shelters, seasonal closure of islands, sign posting, wardens, education programs, and law enforcement. (Tern Management Handbook) Continue efforts to monitor occupied and historic nesting islands including Machias Seal Island. (BCR 14 Workshop) Continue efforts to protect priority nesting islands through conservation ownership Focus sites may include Machias Seal Island, Magdalen Islands QC, Gaspé Peninsula, Country Island NS, and The Brothers NS.	Continue outreach efforts regarding effects of human disturbance on nesting colonies Initiate research to determine association with commercial fisheries and climate change to food availability (USFWS Tern Plan) Initiate research to determine factors influencing breeding success and productivity rates (BCR 14 Workshop)
Black Guillemot	• BCR population estimate of 25,150 breeding birds; regional breeding population increasing (MANEM waterbird species profile) • breeding and pelagic use	Reduce threats from drowning in commercial fishing nets, contaminants, human disturbance, and habitat loss Continue efforts to protect priority nesting islands through conservation ownership Evaluate need to remove mammalian predators from nesting islands to enhance survival and recruitment rates	
Common Eider (Breeding		Reduce threats from: great black-backed gull predation on ducklings, habitat loss, avian cholera, principle dietary items have	Continue banding efforts to evaluate survival and recruitment rates, movement rates, and hunting mortality (Atlantic

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
Population Only)	<u>Population Objective:</u> By 2015, increase the number of nesting pairs of eiders by 20%	high commercial value, human disturbance on nesting islands, potential over-harvest, aquaculture development, high susceptibility to disturbance and oil spills during molt period Successful management efforts have included island acquisition by conservation agency, seasonal closure of nesting islands, signage of nesting islands, gull control. Increase the number of eider nesting islands in conservation ownership (MDIFW Species Assessment) Habitat conservation efforts should include nesting islands, brood rearing habitat, molting and feeding areas (BCR 14 Workshop)	Coast Sea Duck Workshop, BCR 14 Workshop, MDIFW Species Assessment) Initiate standardized surveys of breeding population, including determining relationship between May male counts and number of nesting hens on islands.(BCR 14 Workshop) Continue efforts to develop reliable technique to census breeding population which would allow population trends to be monitored (Atlantic Coast Sea Duck Workshop / BCR 14 Workshop) Document seasonal distribution of eiders significant, particularly brood rearing and molting areas (Atlantic Coast Sea Duck Workshop / BCR 14 Workshop) Initiate research to evaluate significance of commercial harvesting of resources from eider brood rearing and feeding habitats (MDIFW Species Assessment and Atlantic Coast Sea Duck Workshop) Improve collection of information from hunters, including level of take and age / sex ratios. Work with outfitters to improve reporting efforts. (Atlantic Coast Sea Duck Workshop / BCR 14 Workshop) Monitor effects of commercial aquaculture development on distribution and feeding rates of eiders (BCR 14

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
			Workshop) Develop population model for eiders (BCR 14 Workshop) Assess significance of gull predation on duckling survival rates (BCR 14 Workshop) Determine genetic composition of harvested population (MDIFW Species Assessment) Initiate research to evaluate significance of recreational use of eider nesting islands (MDIFW Species Assessment) In cooperation with partners, develop outreach programs to promote an understanding and appreciation of eiders and their habitat requirements (MDIFW Species Assessment)
See Estuaries and Bays for Common Eider Molting and Wintering Objectives			
Common Tern	• BCR population estimate of 69,280 breeding birds; regional population increasing (MANEM waterbird species profile) Declines in PEI, NB, QC both in distribution and abundance. 19% of NA population, reasonably large proportion of continental population.	Reduce threats from: predation from gulls, habitat loss, competition for nesting sites with gulls, changes in food availability, human disturbance on nesting islands, and limited number and distribution of colonies Successful management techniques at nesting islands include: Restoration of historical sites using social attraction, vegetation control, predator control, nest shelters, seasonal closure of islands, sign posting, wardens, education	Continue to research foraging habitat, migration routes, winter habitat use and distribution. (USFWS Tern Plan) Continue outreach efforts regarding effects of human disturbance on nesting colonies (USFWS Tern Plan) Initiate research to determine association with commercial fisheries and climate change to food availability (USFWS Tern Plan)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
		programs, and law enforcement. (Tern Management Handbook) Increase the number of historic and currently occupied nesting islands in conservation ownership Continue efforts to monitor occupied and historic nesting islands (BCR 14 Workshop)	Initiate research to determine factors influencing breeding success and productivity rates (BCR 14 Workshop)
Great Cormorant	• BCR population is estimated at 12,300 breeding birds (MANEM waterbird species profile) • >90% of North American breeding population in BCR 14 • High Responsibility in BCR14: 136 pairs in Maine at 8 sites, 660 pairs in Quebec with the remainder in NS, PEI.	• Reduce threats from: predation from gulls and eagles, habitat loss, competition for nesting sites with gulls, changes in food availability, human disturbance on nesting islands, and limited number and distribution of colonies • Continue efforts to protect priority nesting islands through conservation ownership • Considered “nuisance” status in New Brunswick, occasional DCCO hunts.	• Need to develop strategies to monitor productivity (BCR 14 Workshop) • Continue regular monitoring (every 5 years) in Nova Scotia and (every year) in PEI. • Establish breeding success at selected colonies. • Continue annual surveys of colonies (BCR 14 Workshop) • Evaluate factors which may be limiting population growth
Harlequin Duck	• Breeding in Quebec (Gaspé Peninsula) and bordering New Brunswick; wintering throughout rest of the BCR <u>Population Objectives:</u> increase the number of wintering harlequins by 20%, by 2016 (MDIFW Species Assessment)	Reduce threats from low fecundity rates and high rate of non-breeding in female harlequins, which increases significance of adult survival rates, and threats from oil spills. Listing concerns for state of Maine: size of population wintering in Maine, small size of NA population and percentage of that population wintering in Maine (50%), and more than 90% of the birds winter at fewer	• Continue research on survival rates, habitat use, and site fidelity (Maine T&E Handbook) Initiate annual surveys at traditional wintering sites and period coast-wide surveys (BCR 14 Workshop and MDIFW Species Assessment) Initiate research to determine factors limiting over-winter survival of

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
		than 5 locations. Distribution within Maine is limited to a small number of islands including Isle au Haut and neighboring islands in Jericho and Penobscot Bays By 2005, identify and map all important harlequin wintering sites in Maine (MDIFW Species Assessment) Minimize activities such as dragging for shellfish and disturbance from waterfowl hunters that disrupt harlequin feeding activities (Maine T&E Handbook)	harlequins (MDIFW Species Assessment) • Satellite and genetic studies are underway to determine relationship between Canadian and Greenland populations Initiate research to evaluate significance of commercial harvesting of resources from harlequin feeding areas (MDIFW Species Assessment) Continue efforts to educate public about ecology of harlequins and hunter identification “tips” to avoid incidental take during waterfowl harvest In cooperation with partners, develop an outreach program to promote an understanding and appreciation of harlequins and their winter habitat requirements in Maine (MDIFW Species Assessment)
Herring Gull	• BCR population estimate of 194,440 breeding birds; regional population declined in US from 1970s to 1990s (MANEM waterbird species profile) • year-round resident	Reduce threats from competition with Great Black-backed Gulls, limited availability of suitable nesting sites, contaminants, and reduction in food availability due to commercial fisheries Breeding populations on a limited number of seabird restoration islands have been eliminated or significantly reduced in number and distribution In local areas where seabird restoration is	Monitor abundance and distribution. Research the impacts of contaminants on the existing populations.

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
		being promoted, avoid overboard discharge of bait or fish waste that may enhance gull feeding efforts and populations (Maine T&E Handbook)	
Northern Gannet	See Marine Open Water for Objectives		
Purple Sandpiper	• 4,000+ individuals were observed in Maine in 2003 • Wintering resident only	Reduce threats from oil spills and human disturbance	• Continue or expand efforts to document winter distribution (PRISM) (BCR 14 Workshop) • Expand efforts to band birds and document site fidelity
Razorbill	• BCR population estimate of 15,110 breeding birds • State Threatened in Maine • Breeding and wintering use in BCR; significant wintering population documented off Grand Manan Island <u>Population Objective:</u> Increase population (MANEM) By 2015, increase Maine population by 50% over level recorded in 2000 (MDIFW Species Assessment)	Threats include: predation from gulls, habitat loss, changes in food availability, oil spills, incidental take during fishing, and limited number and distribution of colonies • By 2005, identify and prioritize islands with suitable nesting habitat and cultivate relationships with partners and landowners to facilitate management (MDIFW Species Assessment) • By 2015, increase the number of islands supporting nesting razorbills to 8, ensuring these islands are distributed between Penobscot Bay and downeast Maine. (MDIFW Species Assessment) Maintain seasonal closure of nesting islands Continue efforts to protect priority nesting islands through conservation ownership <u>Focus Area:</u>	• Conduct surveys to determine winter distribution and habitat use of razorbills (BCR 14 Workshop) • Determine breeding locations for birds wintering in the Gulf of Maine (BCR 14 Workshop) • Develop and implement by 2005 a protocol to inventory and monitor productivity rates of nesting razorbills (MDIFW Species Assessment) • By 2005, develop and implement, in conjunction with partners, an outreach plan to promote an understanding and awareness of seabirds, including razorbills. (MDIFW Species Assessment) • Evaluate need and ability to control gull populations on “un-staffed” nesting islands (MDIFW Species Assessment) • Initiate research on basic life history and ecology of razorbills, including

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
		Wintering population near Grand Manan Machias Seal Island Matinicus Rock	breeding success and productivity, characteristics and location of foraging and chick rearing habitats, and survival rates of adult and immature birds. (MDIFW Species Assessment)
Roseate Tern	• BCR population estimate is 518 breeding birds • Federally Endangered <u>Population Objective:</u> Increase breeding population size, distribution, and productivity	• Reduce threats from: predation from mink and gulls, habitat loss, changes in food availability, limited number and distribution of colonies, inclement weather Successful management techniques at nesting islands include: • Restoration of historical sites using social attraction, vegetation control, predator control, nest shelters, seasonal closure of islands, sign posting, wardens, education programs, and law enforcement. (Tern Management Handbook) Continue efforts to monitor occupied and historic nesting islands (BCR 14 Workshop) Increase the number of historic nesting islands in conservation ownership (ROST Recovery Plan) Focus Areas: Country Island NS, The Brothers NS, Grassy Island NS, Wedge Island NS.	Continue to research foraging habitat, migration routes, winter habitat use and distribution. (ROST Recovery Plan) Continue outreach efforts regarding effects of human disturbance on nesting colonies (ROST Recovery Plan) Initiate research to determine association with commercial fisheries and climate change to food availability
Ruddy Turnstone	See Unconsolidated Shore for objectives		
Semipalmated Sandpiper	See Unconsolidated Shore for objectives		

Unconsolidated Shore (beach, sand, mudflats)

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Golden Plover	2		X		Ruddy Turnstone	2		X	
Black-bellied Plover	2		X		Semipalmated Sandpiper	1		X	
Herring Gull	2	X		X	Short-billed Dowitcher	2		X	
Piping Plover	1	X			Whimbrel	2		X	
Red Knot	2		X						

Issues:

Dense human populations are frequently located within the coastal regions of the north-eastern U.S., and as a result, the beach and dune communities associated with these areas are subject to tremendous pressures from recreational activities. Habitat loss, escalating human activity, and increasing populations of “human- associated” predators (i.e raccoon and fox) combine to create significant threats to many of the species utilizing this habitat. The Atlantic Coast population of Piping Plovers, which use this habitat for breeding, is as a threatened species in the U.S. and Canada.

Commercial harvesting of marine invertebrates occurs extensively throughout the state. The effects of this activity, both from a disturbance standpoint and an extraction of resources have yet to be evaluated. Many municipalities also try to rake beaches to remove seaweed rack and enhance aesthetic appearances of the beaches. Removal of the vegetation and the associated invertebrate community results in a significant reduction in food resources for many species.

Threats:

- Recreational disturbance to nesting and foraging birds
- Beach cleaning efforts
- Nuisance/predator species
- Loss of habitat
- Extraction of resources affecting shorebird food supplies
- Oil spills / contaminants
- Flooding

Goal:

Conserve, restore and enhance populations of focal species which utilize unconsolidated shores (e.g. beaches and mudflats) to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. *Protect and manage sufficient area of high priority habitats to support current populations of breeding, migrating, and wintering shorebirds and associated focal species.*

Strategy	Task
Identify priority habitats for protection.	• Identify and manage sufficient foraging and roosting habitat (intertidal complexes and impoundments) to maintain and enhance regionally important populations, for species with overlapping requirements (RUTU, SESA, SBDO, SAND, BBPL). (N. Atlantic Regional Shorebird Plan) • Research best method of protection—acquisition, fee or easements from willing sellers • Develop coordinated state and federal satellite habitat mapping, delineating all important shorebird habitats (N. Atlantic Regional Shorebird Plan) • Maintain and coordinate habitat protection of areas already owned by federal, state, local government or NGO's. • Train land managers to manage habitat for shorebirds by increasing the number of Manomet habitat management workshops. (MANEM working group) • Research, assess, and implement control programs for mammalian and avian predators for high priority beach nesting birds (BCR 14 workshop) • Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important shoreland habitat (MDIFW E&T Handbook) • Avoid future residential development of beach and dune habitat (MDIFW E&T Handbook)
Restore degraded habitats.	• Continue to support state IBA Program • Dredge material has been successfully used in some instances to create new habitat, especially for terns and plovers, although all habitat alterations should be conducted with caution and after consultation with experts; new substrates should not be overly silty and depositions with over 20% shell material could interfere with nest construction. (PIF) • Utilize dredged material to implement erosion control efforts. (Tern Management Handbook) • Vegetation encroachment can degrade habitat for terns and should be prevented at important nesting sites. Addition of dredge spoils on vegetated beach areas may impede succession. (PIF) • Assess habitat quality for foraging shorebirds through resource or energetic studies

	in representative habitats throughout the BCR. (NAWCP workshop) • Continue or develop and implement invasive species removal program • Conduct vegetation studies and remove vegetation where it is deemed excessive with the appropriate tools (fire, hand-pulling, grazing, etc). (MANEM working Group and Tern Management Handbook)) • Implement floating rafts where flooding threatens nesting species. (Tern Management Handbook)
Identify and protect adequate buffers (inland and offshore).	• Identify landowners of upland buffers • Determine the effects of disturbance and minimum protection buffers to maintain and enhance shorebird habitat use of foraging and roosting areas (N. Atlantic Regional Shorebird Plan) • Determine best method of land conservation and protection—acquisition, fee, easement. • Initiate landowner contact.
Research Needs	• Identify prey resources in significant stopover and staging areas to determine optimal management techniques to promote these resources (N. Atlantic Regional Shorebird Plan) • Determine the effects of environmental contaminants on shorebirds and their prey (N. Atlantic Regional Shorebird Plan) • Determine length of stay (turnover rates) at stopovers to allow population estimates to be determined (N. Atlantic Regional Shorebird Plan) • Determine limiting factors for priority shorebirds on breeding, migratory, or wintering grounds (N. Atlantic Regional Shorebird Plan)

2. Maintain or enhance populations of high priority species.

Strategy	Task
Actively deter, reduce or eliminate predators.	• Use fences and other barriers to reduce predator impacts • Implement predator control plans where they do not already exist. • Utilize predator control management techniques in Tern Management Handbook.
Reduce or eliminate human disturbance	• Restrict access to nesting beaches during mid April to late July. • Prohibit free-running dogs. • Post signs to alert and educate public to presence of nesting birds. (N. Atlantic Regional Shorebird Plan) • Use fences and other barriers to reduce human impacts.

	• Protect breeding sites from habitat alteration and overuse from recreational activities, including nighttime activities. (N. Atlantic Regional Shorebird Plan) • Implement or utilize existing (partners) outreach opportunities to educate public about their impacts to wildlife (ME Audubon). • Increase law enforcement at sites with high human disturbance. • Increase outreach activities to gain support for protection of species. (Tern Management Handbook)
Monitor breeding and non-breeding populations of focal species to determine population size, status and trends.	• Participate in the implementation of the Program for Regional and International Shorebird Monitoring (PRISM) • Design and conduct coordinated aerial survey targeting migrating shorebirds in spring (PIF) • Develop a targeted monitoring program for high priority shorebird species, including staging and migration sites (coordinate with PIF projects). (N. Atlantic Regional Shorebird Plan) • Maintain or enhance shorebird populations, both abundance and species diversity, and monitor populations through reliable and cost-effective techniques (N. Atlantic Regional Shorebird Plan) • Monitor shorebirds for responses to current management practices. • Analyze threats to priority shorebird sites. • Investigate possible negative impacts that rising ocean levels from global climate change could have species. (PIF) • Continue to evaluate factors that limit populations of the priority species from this habitat suite and impede recovery, including studies of (a)habitat requirements for breeding, foraging, and staging, (b) demographics, (c) causes of mortality, and (d) factors limiting growth and survival of young • Investigate the behavior and population ecology of predators impacting the priority bird species to provide a better understanding of how to protect the birds from depredation. • Investigate potential threats from pesticide and heavy metal accumulation.
Plan for oil spill response.	• Continue Spill Response efforts and planning, including purchasing survey and hazing equipment (N. Atlantic Regional Shorebird Plan) • Identify and map significant habitat for nesting, migratory, and wintering species • Document habitat quality and food resources prior to spill to serve as baseline for assessing direct and indirect effects of spills (N. Atlantic Regional Shorebird Plan) • Implement post spill surveys to accurately quantify spill damages. • Effects on birds should be minimized by increase enforcement of shipping

	activities, safe operational procedures, spill clean up and rehabilitation of oiled birds.
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Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Golden Plover	Surveys along the Maine coast in 1994 documented 10 individuals		
Black-bellied Plover	Surveys along the Maine coast in 1998 documented 3,411 individuals	Identify and manage sufficient foraging and roosting habitat to maintain and enhance regional populations. (N. Atlantic Regional Shorebird Plan)	
Herring Gull	See Islands habitat section for specific objectives for this species		
Piping Plover	Listed as threatened by USFWS, CWS and endangered by MDIFW	Reduce threats from habitat loss and degradation, human/dog disturbance, beach cleaning activities, and predation. Over two-thirds of Maine's 30 miles of beaches have been lost as nesting habitat for piping plover because of construction of jetties, seawalls, and high density housing. Continue existing management techniques including: fencing, predator control, sign posting, wardens and education programs. Prohibit or minimize the following activities on nesting beaches: driving on beaches, kite flying, fire works, residential development, jetty and seawall construction, unleashed dogs, construction activities occurring between April 1-August 31 (Maine T&E Handbook) See USFWS Piping Plover Recovery Plan:	Continue efforts to educate public and municipal officials regarding the ecology and life history requirements of plover. Continue working with conservation partners to protect nesting areas and enforce "area closed" practices

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
		http://pipingplover.fws.gov/recplan/index.html	
Red Knot	Surveys along the Maine coast in 1993 documented 425 individuals	Identify and manage foraging and roosting habitat (intertidal-mud) to maintain migration stopover integrity, by protecting and managing key concentration areas (N. Atlantic Regional Shorebird Plan)	
Ruddy Turnstone	Surveys along the Maine coast in 1994 documented 4,317 individuals	Identify and manage sufficient foraging and roosting habitat to maintain and enhance regional populations. (N. Atlantic Regional Shorebird Plan)	
Semipalmated Sandpiper	Surveys along the Maine coast in 1994 documented 53,950 individuals	Identify and manage sufficient foraging and roosting habitat to maintain and enhance regional populations. (N. Atlantic Regional Shorebird Plan)	
Short-billed Dowitcher	Surveys along the Maine coast in 1996 documented 3,664 individuals	Identify and manage sufficient foraging and roosting habitat to maintain and enhance regional populations. (N. Atlantic Regional Shorebird Plan)	
Whimbrel	Surveys along the Maine coast in 1995 documented 329 individuals	Identify and manage foraging and roosting habitat (intertidal-mud) to maintain migration stopover integrity, by protecting and managing key concentration areas. (N. Atlantic Regional Shorebird Plan)	

Estuarine Emergent Saltmarsh

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Black Duck	1	X		X	Short-billed Dowitcher	2		X	
Black-crowned Night Heron	2	X			Whimbrel	2		X	
Nelson's Sharp-tailed Sparrow	1	X							

Issues:

Degradation of existing habitat is a common concern across the BCR. Surrounding land uses (e.g., agriculture, development) may not often be compatible with conservation of coastal saltmarshes and development/construction projects still pose threats in terms of continued habitat loss.

Threats:

Habitat loss and alteration
Oil spills and contaminants
Mosquito control efforts
Human disturbance

Goal:

Conserve, restore and enhance populations of focal species in estuarine emergent saltmarsh habitat to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. Protect and maintain high priority habitats.

Strategy	Task
Identify priority habitats for protection.	• Research best method of protection—acquisition, fee or easements from willing sellers • Maintain and coordinate habitat protection of areas already owned by federal, state, local government or NGO's. • Create and restore habitat in focus areas through manipulation, augmentation, etc. • Protect marshes from chemical contamination, siltation, eutrophication, and other forms of pollution. • Train land managers to manage habitat for shorebirds by increasing the number of Manomet habitat management workshops. (MANEM working group)
Restore degraded habitat	• Assess habitat quality for foraging shorebirds through resource or energetic studies in representative habitats throughout the BCR. • Continue or develop and implement invasive species removal program • Conduct vegetation studies (MANEM working Group)
Plan for oil spill response.	• Implement planning and simulations or partner with those that are currently participating in these types of activities. (MANEM working group) • Monitor and quantify habitat and food resources prior to spill as preparation for quantifying the direct and indirect impacts of a spill. (MANEM working group) • Effects on birds should be minimized by increase enforcement of shipping activities, safe operational procedures, spill clean up and rehabilitation of oiled birds.
Secure adequate upland buffers (drier habitats	• TO preserve water quality and wetland function, maintain contiguous, forested riparian

adjoining wet marsh areas), especially for marshes near agricultural lands and human development. (PIF)	habitat at least 250' from saltmarsh (MDIFW E&T Handbook) • Identify landowners of upland buffers • Determine best protection—acquisition, fee, easement. • Initiate landowner contact.
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2. Maintain or enhance populations of high priority species.

Strategy	Task
Monitor breeding and non-breeding populations of focal species to determine population size, status, and trends.	• Participate in the implementation of the Program for Regional and International Shorebird Monitoring (PRISM) • Develop and implement a regional monitoring program targeting coastal marshes in order to track population trends and estimate population sizes for all groups of birds • Develop a targeted monitoring program for high priority shorebird species, including staging and migration sites (coordinate with PIF projects). • Monitor shorebirds for responses to current management practices. • Analyze threats to priority shorebird sites. • Study how land-use practices such as ditching, impounding, dredging, open marsh water management, burning, and marsh restoration impact species in this suite (especially sparrows and rails) to determine optimal habitat management practices. (PIF) • Conduct studies of productivity and survival of sparrow populations across the planning unit to understand factors regulating population size and persistence. (PIF) • Investigate possible negative impacts that rising ocean levels from global climate change could have on marsh-nesting species. (PIF)
Eliminate or reduce human disturbance.	• Develop and implement outreach projects to reduce human disturbance (N. Atlantic Regional Shorebird Plan) • Partner with existing organizations to enhance efforts • Increase law enforcement at protected sites. • Increase agency capacity focused on permit and technical assistance for shorebird, landbird, waterbird species. • State agencies should fund incentives or measures to eliminate waterbird bycatch; specific suggestion for mid-Atlantic is to buy out gill-net fisheries. (BCR 30 workshop) • Encourage local planning (e.g., rolling setbacks and other tools) to ensure important breeding and non-breeding habitat is not affected by sea level rise due to climate change. (BCR 30 workshop)
Incorporate protection of priority species into oil spill response plans.	• Coordinate with appropriate partners..... • Identify key tern foraging sites, prey base and stocks (MANEM working group)

	Effects on birds should be minimized by increase enforcement of shipping activities, safe operational procedures, spill clean up and rehabilitation of oiled birds. (S. Atlantic Migratory Bird Initiative)
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Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Black Duck	See Estuaries and Bays for Objectives		
Black-crowned Night Heron	Population estimated at 118 pairs at 7 colonies	No clear threats or declines known, however likely to be influenced by habitat loss and human disturbance (BCR 14 Workshop) Protect integrity of existing breeding and foraging habitat	Evaluate significance of heron predation on tern colonies (BCR 14 Workshop)
Nelson's Sharp-tailed Sparrow	Stable or possibly increasing BBS trend (+1.68% / year for 1966-1999) >90% of eastern subspecies breeds in BCR 14 <u>Population Objective:</u> Maintain stable population in BCR (PIF)	Reduce threats from: loss and degradation of saltmarsh habitat, sea level rise, oil spills, industrial discharge, and contaminants (mercury) Protect breeding habitat and surrounding upland habitat at all occupied sites (BCR 14 Workshop) Determine effects of saltmarsh restoration efforts on species (BCR 14 Workshop) Evaluate need to restore tidal flow to "historic" marsh habitat (i.e. remove tide gates / install larger culverts) (BCR 14 Workshop)	Species is poorly covered by traditional BBS routes, and therefore requires specific monitoring efforts targeted at this and other saltmarsh species for a better understanding of the taxonomic status with the interior subspecies and develop a better population estimate (BCR 14 Workshop) Inventory of New England saltmarshes has been completed, but now need to establish long-term monitoring program (BCR 14 Workshop) Continue contaminant investigations to evaluate significance to population (BCR 14 Workshop)
Short-billed Dowitcher	See Unconsolidated Shore for Objectives		
Whimbrel	See Unconsolidated Shore for Objectives		

Freshwater Wetlands

This habitat type supports thousands of lakes and ponds and tens of thousands perhaps hundreds of thousands of wetlands. Many states and provinces have lost large portions of their wetland resource. The greatest losses occurred in floodplain wetlands (including forested wetlands and vernal pools) following hydropower development along major rivers. Over time, agriculture also has contributed heavily to losses (and conversion) of wetland habitat. American Black Ducks are synonymous with beaver flowages, ponds and marshes in the BCR 14. Despite long-term declines they remain a common if not the most abundant breeder in the region. The wetland habitats used by black ducks and other associated species are protected by both state/provincial and federal laws. However, small incremental losses continue to occur across the region.

Associated priority species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Bittern	3	X			Herring Gull	2	X		
American Black Duck	1	X		X	Least Sandpiper	3		X	
American Woodcock	1	X			Northern Harrier	3	X		
Bald Eagle	3	X		X	Olive-sided Flycatcher	2	X		
Bank Swallow	3	X			Palm Warbler	3	X		
Barn Swallow	3	X			Rusty Blackbird	2	X		
Barrow's Goldeneye	1			X	Short-eared Owl	3	X	X	
Black-crowned Night Heron	2	X			Wilson's Phalarope	3	X		
Canada Warbler	1	X			Wood Duck	3	X		
Common Goldeneye	3	X		X	Yellow Rail	3	X		
Common Loon	3	X			Yellow-bellied Flycatcher	3	X		
Common Tern	2	X							

Freshwater Lakes, Rivers, and Streams

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Black Duck	1	X		X	Common Tern	2	X		
Barrow's Goldeneye	1			X	Common Loon	3	X		

Consider adding Common Loon and Bald Eagle

Issues:

The amount of freshwater wetlands that have been lost or degraded during the last century is huge. The greatest threats to most species in this habitat suite are continuing loss and alteration of wetland habitat through draining, dredging, filling, pollution, acid rain, agricultural practices, and siltation. Various contaminants (e.g., pesticides, insecticides, heavy metals, acid deposition, etc.) from industrial, agricultural, and urban/suburban sources can degrade wetland ecosystems and impair reproductive abilities of the birds. The size of wetlands is also an important consideration for some of the priority species in this habitat suite. Many of these species occur more often and at higher abundances in larger wetlands. Loss of wetland habitat continues to be the primary concern for the species of this habitat suite, and preservation of existing wetland sites should be the first priority for conservation actions in this habitat type.

Threats:

- Loss/alteration of habitat
- Contamination from various pollutants
- Invasive Species

Goal:

Conserve, restore and enhance populations of focal species in the freshwater lake, rivers, and streams habitat suite to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. *Protect and maintain high priority habitats.*

Strategy	Task
Identify priority habitats for protection.	• Preserve all large (> 10 ha) freshwater wetlands from development, draining, and other forms of habitat loss. (PIF) • Evaluate habitat requirements, including nest site characteristics, water quality, and minimum wetland area needed during both the breeding and non-breeding seasons. (PIF)
Maintain and manage priority habitats already protected.	• Coordinate habitat protection of areas owned by federal, state, local government or NGO's. • Continue to implement Wetland Protection regulations. • Investigate wetland management alternatives that can provide a variety of wetland habitat conditions that are suitable to the various needs of the priority species in this habitat suite. (PIF)

	• Evaluate habitat requirements, including nest site characteristics, water quality, and minimum wetland area needed during both the breeding and non-breeding seasons. (PIF) • Design a regional management program for these wetland species that continue to be threatened by habitat loss, including increased coordination among managers and biologists to prevent duplication of research efforts and to share current information. • Creation of new nesting habitat may be needed for some species in this physiographic area. Minor alterations to existing management activities for waterfowl, such as leaving some dense stands of cattail and bulrush for nesting sites and maintaining fairly stable water levels during the nesting season, should benefit many of these species. Complete drying of impoundments during drawdowns should be avoided to prevent the die-off of small fish, amphibians, and dragonflies, which are a major food sources for many of these bird species. Slow drawdowns should benefit bitterns by providing suitable foraging habitat and encouraging dense stands of emergent vegetation for nesting. (PIF)
Reduce/eliminate wetland alteration and degradation.	• Implement new and existing outreach efforts to the general public to gain support for wetland protection. • Wetlands used as breeding sites should be protected from chemical contamination, siltation, eutrophication, and other forms of pollution/contamination that could directly harm breeding birds or their food supply. (PIF) • Hemi-marsh conditions favored by grebes and ducks need to be maintained by periodic reversal of vegetation succession to open up some of the extensive stands of emergent vegetation, but suitable habitat for nesting needs to be maintained in nearby areas during wetland management. (PIF)
Reduce/eliminate invasive species.	• Evaluate effects of invasive plants such as <i>Phragmites</i> and purple loosestrife. (PIF) • Work with partners to remove invasive species from infested priority habitats. • (http://invasives.eeb.uconn.edu/ipane) and other invasive species groups for guidance on removal.

2. Maintain and enhance populations of high priority species.

Monitor breeding and non-breeding populations of focal species to determine population size, status and trends.	• Develop a targeted monitoring program for high priority species. Coordinate with PIF projects. (BCR 30 workshop) • Utilize standard methods for conducting point-counts using tape-recorded
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	vocalization playback. (PIF) • Determine causes of breeding failure and mortality of young and adults. (PIF)
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Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Black Duck	See Palustrine Emergent Marsh for Breeding Objectives, Estuaries and Bays for Wintering Objectives		
Barrow's Goldeneye	See Estuaries and Bays for Objectives		
Common Tern	See Islands for Objectives		
Common Loon	BCR population estimated at 5,900 by MANEM Stable in US portion, regional decline in Canada Breeds across BCR with exception of extreme southern portion	Reduce threat from acidification, mercury, and oil pollution in winter. Reduce disturbance in key breeding areas, protect nestings sites in areas of heavy human recreational use Protect wetland habitat from development, contaminants, and other degradation Maintain consistent water levels during breeding season	- Determine impacts of human disturbance - Linking wintering and breeding populations - Identify appropriate census interval - Continued work on mercury - Impacts of botulism outbreaks and emaciation syndrome - continue outreach and education efforts in southern regions of BCR as development and recreation increases

Palustrine Emergent Marsh

Associated Focal Species:

Species	Priority	B	M	W
American Black Duck	1	X		X
Black-crowned Night Heron	2	X		

Issues:

Threats:

Habitat loss and degradation

Goals:

General Objectives:

Conserve, restore and enhance populations of focal species in Palustrine emergent marsh habitat to ensure the overall conservation of all native species within this habitat.

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Black Duck (Breeding Population)	Maine population estimated at: 32,300 individuals (or pairs??)	Reduce threats from competition with Mallards, human disturbance, habitat loss and degradation, and contaminants.	Expand population model to include habitat characteristics (BCR 14 Workshop)
	Maine harvested 9,717 birds in 2002 Year round presence in Maine Obj being developed by NSST	Peatlands in northern part of BCR are threatened by peat extraction (BCR 14 Workshop)	Expand survey efforts throughout BCR to cover areas currently not included in aerial surveys (BCR 14 Workshop) Breeding ground survey from the ground in Quebec along the coast (BCR 14 Workshop)
See Estuaries and Bays for Wintering Objectives			
Black-crowned Night Heron	See Estuarine Emergent Saltmarsh for Objectives		

Forested Wetland

Associated Focal Species:

Species	Priority	B	M	W
American Black Duck	1	X		X
Black-crowned Night Heron	2	X		
Rusty Blackbird	2	X		

Issues:

Threats:

Habitat loss and degradation

Goals:

Conserve, restore and enhance populations of focal species in forested wetlands to ensure the overall conservation of all native species within this habitat.

General Objectives:

Conserve, restore and enhance populations of focal species in Forested Wetland habitat to ensure the overall conservation of all native species within this habitat.

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Black Duck	See Palustrine Emergent Marsh for Breeding Objectives, Estuaries and Bays for Wintering Objectives		
Black-crowned Night Heron	See Estuarine Emergent Saltmarsh for Objectives		
Rusty Blackbird	Uncertain BBS trend in BCR 14 <u>Population Objective:</u> Attempt to double population (PIF);. See Population Estimates table for numerical estimates and objectives	Threats: Vulnerable to competition from open area species; reduction of wooded wetlands; large territories (.5km) and clear cutting, southern end of range (1.1% of breeding population in BCR), and important habitat integrator (i.e. mosaics and snags). Conserve mosaics of forested wetlands within landscape level habitat management efforts (BCR 14 Workshop)	Need basic information on species distribution, demography, and limiting factors. (BCR 14 Workshop) Determine population trends (BCR 14 Workshop) Document habitat requirements and breeding needs for the species (BCR 14 Workshop)

Shrub-scrub Wetland, including bogs**Associated Focal Species:**

Species	Priority	B	M	W	Species	Priority	B	M	W
American Woodcock	1	X			Olive-sided Flycatcher	2	X		

Canada Warbler	1	X			Rusty Blackbird	2	X		
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Issues:

Threats:

Habitat loss and degradation

Goals:

Conserve, restore and enhance populations of focal species in shrub-scrub wetlands and bogs to ensure the overall conservation of all native species within this habitat.

General Objectives:

Conserve, restore and enhance populations of focal species in Shrub-scrub Wetlands, including bogs, to ensure the overall conservation of all native species within this habitat.

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Woodcock	See Shrub / Early Successional habitat for Objectives		
Canada Warbler	See Deciduous/Mixed Forest for Objectives		
Olive-sided Flycatcher	See Deciduous/Mixed Forest for Objectives		
Rusty Blackbird	See Forested Wetland for Objectives		

Uplands

Associated Priority Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Golden Plover	2		X		Horned Lark	3	X		
American Redstart	2	X			Ipswich Savannah Sparrow	1	X		
American Woodcock	1	X			Killdeer	3	X		
Barn Swallow	3	X			Long-eared Owl	2	X		
Bay-breasted Warbler	1	X			Northern Flicker	3	X		
Bicknell's Thrush	1	X			Northern Goshawk	3	X		X
Black-backed Woodpecker	3	X		X	Northern Harrier	3	X		

Black-bellied Plover	2		X		Northern Parula	3	X		
Black-billed Cuckoo	3	X			Olive-sided Flycatcher	2	X		
Blackburnian Warbler	3	X			Ovenbird	3	X		
Blackpoll Warbler	3	X			Palm Warbler	3	X		
Black-throated Blue Warbler	2	X			Pine Grosbeak	3	X		X
Black-throated Green Warbler	3	X			Purple Finch	2	X		X
Blue-winged Warbler	2	X			Rose-breasted Grosbeak	3	X		
Bobolink	2	X			Ruffed Grouse	3	X		X
Boreal Chickadee	2	X		X	Short-eared Owl	3	X	X	
Boreal Owl	3			X	Upland Sandpiper	2	X		
Brown Creeper	3	X		X	Veery	2	X		
Canada Goose – NAP	2		X		Vesper Sparrow	3	X		
Canada Warbler	1	X			Whip-poor-will	3	X		
Cape May Warbler	2	X			Willet	3	X		
Chestnut-sided Warbler	2	X			Wilson's Snipe	3	X		
Chimney Swift	2	X			Wood Thrush	1	X		
Common Nighthawk	2	X			Yellow-bellied Flycatcher	3	X		
Eastern Wood-Pewee	2	X			Yellow-bellied Sapsucker	2	X		
Gray Jay	3	X		X					

Deciduous and Mixed Forests

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Redstart	2	X			Olive-sided Flycatcher	2	X		
Black-throated Blue Warbler	2	X			Purple Finch	2	X		X
Canada Warbler	1	X			Veery	2	X		
Chimney Swift	2	X			Wood Thrush	1	X		
Eastern Wood-Pewee	2	X			Yellow-bellied Sapsucker	2	X		
Long-eared Owl	2	X							

Issues:

Northern hardwood and mixed forests, usually dominated by sugar maple, beech, and birch represent the most widely distributed habitat-community within the region. Although mature hardwoods (and associated white pine) were extensively harvested in the past century, these

forests have largely regenerated over most of the region during the past 50 years. In the Canadian provinces and northern Maine, however, where commercial timber production is the dominant land use, regenerating conifer stands have replaced the original hardwood forest over vast areas. Today, hardwood and mixed forest types are dominant in New England and at lower elevations in southern Quebec and southern New Brunswick. Throughout this recent history of widely fluctuating availability in the region, few if any bird species dependent on northern hardwood forests have been lost or severely reduced in abundance. The importance of this habitat type is great, because of the number of associated bird species with high proportions of their total population in the region. In general, these species are relatively abundant throughout the region, and many show stable or even increasing population trends. Setting habitat and population objectives is therefore not as straightforward as in the mountaintop or mature conifer habitat types. Conservation planning should focus on extensive tracts of representative forest types, and should address the microhabitat needs of species showing regional or local declines. A majority of high-priority species in this habitat are dependent on particular characteristics of the forest understory.

Threats:

- Large-scale forestry operations, resulting in habitat fragmentation, change in species and age composition
- Habitat loss associated with development
- Predation and Parasitism
- Contaminants
- Habitat loss on migration and wintering grounds

Goal:

Conserve, restore and enhance populations of focal species in the mature deciduous/mixed forest to ensure the overall conservation of all native species within this habitat.

General Objectives

1. *Protect and maintain high priority habitats.*

Strategy	Task
Identify priority habitats for protection.	• Conduct land use analysis to identify all remaining large forest block (e.g., ≥ 350 ha) and landscapes with high % forest cover (e.g., $> 70\%$). (U.S. PIF)
Target large forest blocks for protection. (PIF)	• Collect ownership/contact information. • Research best method of protection—acquisition, fee or easements from willing sellers
Maintain and manage priority habitats already protected.	• Coordinate habitat conservation and appropriate management of areas already owned by federal, state, local government or NGO's. (BCR 30 workshop) • Create and restore habitat in focus areas through manipulation, augmentation, connecting smaller forest blocks to create large patches, etc (U.S. PIF) • Assess vegetation structure to ensure that appropriate structural characteristics of the habitat are being maintained. (U.S. PIF)

	• If forest stands have reached a late-successional stage but have little shrub or mid-canopy vegetation and few breaks in the canopy, low-level management through selective cuts or thinning may improve habitat conditions. (U.S. PIF) • Assess the effects of various logging practices (including selection and shelterwood cuts) on occurrence, breeding density, and nesting success of the priority species in this habitat suite. (U.S. PIF) • Develop specific forest management guidelines for high priority species. (BCR 30 workshop)
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2. *Maintain or enhance populations of high priority species.*

Strategy	Task
Monitor populations of focal species and species from the suite to determine population sizes, statuses, and trends.	• Design and conduct targeted monitoring program to track population trends of forest interior species that are not well-covered by BBS in this physiographic area. (U.S. PIF) • Monitor reproductive success of this suite of species at different locations throughout region to better understand where forest fragmentation causes problems and where it does not. (U.S. PIF) • Assess sensitivity of species in this habitat suite to pesticides currently being used to control gypsy moths and other insect pest species. (U.S. PIF) • Studies of reproductive success, lingering impacts of pesticide use, prey population levels, habitat characteristics of nest sites and preferred foraging areas. (U.S. PIF) • Determine relative importance and use of other habitat types during the post-fledging period prior to migration. (U.S. PIF)

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Redstart	<u>Declining BBC trend in BCR 14 (-1.07%/yr, P=0.013 for 1966-1999)</u> <u>Population Objective:</u> Maintain current population level (PIF) See Population Estimates	Threats: Some data suggest population decline may be partially a result of forest maturation. Likely benefit from the maintenance of large areas of habitat where natural successional processes are allowed or simulated.	Adequately sampled by BBS, continue monitoring with BBS (BCR 14 Workshop). Additional research must be done to assess habitat relationships and reproductive survivorship during winter.

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	table for numerical estimates and objectives		
Black-throated Blue Warbler	<u>Stable in BSS trend in BCR 14 (+0.964%/yr ; 1996-1999).</u> <u>Population Objective:</u> Maintain current population (PIF) See Population Estimates table for numerical estimates and objectives	Threats: Few- in many areas the species is increasing and often reaches high densities where it occurs. However, declining in Adirondack possibly due to declines in sugar maple, American beech, and even eastern hemlock. Large areas of mature forest with well-developed understory structure needed to ensure species presence.	Well sampled by BBS and other forest studies. No further research needed- perhaps one of the most studied warblers in North America. Could be drafted as “flagship species” for general public outreach activities.
Canada Warbler	Declining BBS trend in BCR 14 (-2.46% / year between 1966-1999) <u>Population Objective:</u> Increase BCR population by 50% (PIF) See Population Estimates table for numerical estimates and objectives	Reduce threats from habitat loss and degradation from forest management practices that results in reduced availability of understory vegetation (e.g., over-stocked near-mature even aged stands that have little understory) Halt habitat loss on wintering grounds (BCR 14 Workshop)	Expand network of forest monitoring sites (BCR 14 Workshop) Work with local communities on wintering grounds to educate them about CAWA conservation issues (BCR 14 Workshop) Initiate research on winter habitat use and distribution, evaluate habitat characteristics of breeding habitat, forest management prescriptions, and generate basic information on demography of population. (BCR 14 Workshop)
Chimney Swift	See Urban / Suburban for Objectives		
Eastern Wood-Pewee	Declining BBS trend in BCR 14 (-2.99% / year between 1966-1999) Continental declines but species is common near forest openings or edges <u>Population Objective:</u>	Threats: Not clearly understood, apart from habitat loss Focus areas: Deciduous forest zones	Well covered by BBS, continue monitoring through BBS (BCR 14 Workshop) Examine causes of population decline (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	Increase population by 50% (PIF) See Population Estimates table for numerical estimates and objectives		
Long-eared Owl			Need targeted monitoring to determine population trends Need studies of demography and habitat use to better understand species' needs and what limiting factors are
Olive-sided Flycatcher	See Coniferous Forest habitat section for specific objectives		
Purple Finch	See Coniferous Forest habitat section for specific objectives		
Veery	Declining BBS trend in BCR 14 (-1.19% / year between 1966-1999) <u>Population Objective:</u> Increase population by 50% (PIF) See Population Estimates table for numerical estimates and objectives	Increase habitat quality by increasing availability of understory vegetation in maturing forests; this species also uses early and mid-successional forest, so would benefit from shifting mosaic practices	Continue monitoring through BBS (BCR 14 Workshop) Investigate reasons for population decline and determine status of wintering habitat (BCR 14 Workshop)
Wood Thrush	Declining BBS trend in BCR 14 (-2.49% / year between 1966-1999) <u>Population Objective:</u> Increase BCR population by 50% (PIF) and adjust for long term declines. See Population Estimates	Threats: Not clearly understood, but may include quality and loss of habitat (shrub/scrub layer), acid rain, contaminants, and loss of wintering habitat Develop forest management guidelines which would result in improving habitat quality and quantity (BCR 14 Workshop)	Continue monitoring through BBS (BCR 14 Workshop) Initiate research on population decline, focusing on reproductive success rates in relation to condition of forest (BCR 14 Workshop) Once forest guideline have been developed, work with forest mangers to

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	table for numerical estimates and objectives	Develop regional integrated forest management plan (BCR 14 Workshop)	insure measures are considered during management (BCR 14 Workshop)
Yellow-bellied Sapsucker	Declining BBS trend in BCR 14 (-1.64% / year for 1966-1999) <u>Population Objective:</u> Increase population by 10% (PIF) See Population Estimates table for numerical estimates and objectives	Increase habitat quality for the species by leaving suitable cavity trees after timber harvest operations (BCR 14 Workshop) Threats include loss of nesting trees and cavities.	Need to determine causes of population declines (BCR 14 Workshop)

Coniferous Forest

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
Bay-breasted Warbler	1	X			Long-eared Owl	2	X		
Boreal Chickadee	2	X		X	Olive-sided Flycatcher	2	X		
Canada Warbler	1	X			Purple Finch	2	X		X
Cape May Warbler	2	X							

Issues:

Coniferous forests, dominated by balsam fir and red spruce, represent one of two major forest types (along with northern hardwoods) that occur in a mosaic throughout the region. Large continuous areas of coniferous forest exist in the northern and eastern sections of Maine, central and northern New Brunswick, the Gaspé Peninsula of Quebec, and interior portions of Nova Scotia. Stands dominated by spruces or firs also occur as islands throughout the mixed and hardwood dominated forests further south and west and at lower elevations, depending on drainage and disturbance regimes.

Coniferous (i.e. softwood) tree species are currently preferred for commercial timber production (pulp and paper) in this region, and vast acreages of coniferous forest are under management for commercial forestry. Total area of coniferous forest has increased in the region as mature hardwood and mixed forests were initially logged and replaced by regenerating softwoods. Because of shorter rotation cycles, however, age-class distribution of conifer forest is favoring younger and more even-aged stands. A 1995 forest-management plan for New Brunswick (NB Dept. of

Natural Resources and Energy 1995) projected that mature and overmature classes of spruce-dominated coniferous forest will decline more rapidly over the next 40 years (from 46% of land area to 8%) than any other habitat-community type. Similar trends may also apply to portions of the industrial forests of northern Maine. It is these mature coniferous forests that support a large number of high priority bird species, and if projections are accurate these species may decline throughout the region. Unlike the patchily distributed mountaintop communities, where protection of specific sites is critical, conservation strategies for mature coniferous forest will need to focus on maintenance of minimum percentages of the landscape mosaic to prevent local loss of this habitat type and its associated dependent species. This goal may best be achieved through cooperative agreements with large landowners.

Many of the focal species in this group require better trend information primarily from areas not currently covered by BBS. These species vary widely in preference for age and density of forest, degree of association with wet areas, and tolerance of deciduous or mixed forests. None of these species are critically imperiled, and most are abundant and widespread in the region. However, many of these species have undergone periods of notable decline.

Threats:

- Large-scale forestry operations, resulting in habitat fragmentation of mature forests, changes in species and age composition
- Habitat loss associated with development
- Contaminants
- Habitat loss on migration and wintering grounds

Goal:

Conserve, restore and enhance populations of focal species in coniferous forests to ensure the overall conservation of all native species within this habitat.

General Objective:

Conserve, restore and enhance populations of focal species in Coniferous Forests to ensure the overall conservation of all native species within this habitat.

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
Bay-breasted Warbler	Possibly declining BBS trend in BCR 14 (-1.79% / year between 1966-1999) but is naturally cyclic with spruce budworm outbreaks	Reduce threats from loss of mature spruce-fir habitat due to shortened harvest rotations, spruce budworm suppression efforts, forest fragmentation, loss of wintering habitat, and perhaps global climate change	Investigate effects of spruce budworm suppression efforts on the population, and determine if current population level reflects natural population fluctuations associated with budworm outbreaks (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	<u>Population Objective:</u> Increase population by 50% (PIF) See Population Estimates table for numerical estimates and objectives	Maintain existing large contiguous tracks of mature spruce-fir forest (BCR 14 Workshop)	Initiate efforts to monitor habitat on wintering grounds (BCR 14 Workshop)
Boreal Chickadee	Year-round resident Declining BBS trend in BCR 14 (-6.54% / year between 1966-1999) <u>Population Objective:</u> Increase population by 100% (PIF) See Population Estimates table for numerical estimates and objectives	Reduce threats from habitat loss; conservation issues include rangewide population declines and significant longterm decline in BCR 14.	Determine how well BBS routes sample this species (BCR 14 Workshop) Investigate causes of population decline, including winter ecology and forest fragmentation (BCR 14 Workshop) Clarify habitat relationships (stand level and patch size). Determine current habitat requirements and availability, and establish habitat threshold for species (BCR 14 Workshop)
Canada Warbler	See Deciduous/Mixed Forest habitat section for specific objectives		
Cape May Warbler	Possible BBS declines in BCR 14 (-1.54% / year between 1966-1999) <u>Population Objective:</u> Maintain current population (PIF) See Population Estimates table for numerical estimates and objectives	Reduce threats from loss of mature conifer forest Maintain existing patches of mature conifer forest and incorporate plans for older growth patches into forest management plans (BCR 14 Workshop) Work with industrial foresters to insure long-term availability of mature conifer forest (BCR 14 Workshop)	Continue monitoring through BBS (BCR 14 Workshop) Evaluate relationship to spruce budworm cycles (BCR 14 Workshop)
Long-eared Owl			Need targeted monitoring to determine population trends

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
			Need studies of demography and habitat use to better understand species' needs and what limiting factors are
Olive-sided Flycatcher	Declining BBS trend in BCR 14 (-3.65% / year between 1966-1999) <u>Population Objective:</u> Attempt to double current population (PIF) See Population Estimates table for numerical estimates and objectives	Threats: Not clearly understood, increased predation rates at edge habitats even though species is associated with disturbances and forest edges, habitat loss on S. American wintering grounds Need to identify key breeding locations and assess current habitat conditions and potential threats at those sites (BCR 14 Workshop) Investigate experimental habitat manipulations to enhance local populations (BCR 14 Workshop)	Need to initiate targeted monitoring efforts, such as a species atlas project, particularly in bog habitats (BCR 14 Workshop) Need to confirm population trend (BCR 14 Workshop) Initiate research on limiting factors, effects of silvicultural practices (i.e snag removal), and reproductive success rates in artificial or managed habitats (BCR 14 Workshop) Educate landowners and managers regarding the threats to, and associated decline of the species (BCR 14 Workshop)
Purple Finch	Declining BBS trend for BCR in BCR 14(-2.43% / year for 1966 -1999) <u>Population Objective:</u> Increase population by 50% (PIF) See Population Estimates table for numerical estimates and objectives	Threats: generally unknown, but may be adversely effected by harvesting practices that lead to less structural diversity as forests age and winter habitat loss. Enhance nesting habitat for the species by promoting management practices that provide greater structural diversity within the forest (BCR 14 Workshop)	Continue monitoring population trends, including monitoring in managed forests (BCR 14 Workshop) Gather information on habitat associations, including forest structure, for the species (BCR 14 Workshop) Develop outreach material promoting structural diversity within the forest, and provide to industrial forest managers (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives

Mountaintop Forest

Associated Focal Species:

Species	Priority	B	M	W
Bicknell's Thrush	1	X		
Purple Finch	2	X		X

This habitat type occurs naturally at higher elevations from the Adirondack Mountains of New York, northeastward through northern New England and western New Brunswick to the Gaspé Peninsula of Quebec. As a result its distribution is naturally fragmented at the landscape level, with most patches estimated to be <1,000 ha in extent. The elevations at which this habitat occurs is higher in the southern portions of this region (generally >900 meters in the U.S.) compared to the northern portions (generally >400 meters in Canada). Note that Bicknell's Thrush habitat is not strictly limited to mountaintop forests, particularly in the northern portions of its range, where it breeds on low elevation off-shore islands in Nova Scotia and in some coastal areas along the Bay of Fundy. Appropriate vegetation structure and microclimate might be more important than elevation, per se.

Threats:

- Global climate change
- Acid precipitation
- Recreational and other development
- Contaminants
- Habitat loss on migration and wintering grounds

Goal

Conserve, restore and enhance populations of focal species which utilize mountaintop forest to ensure the overall conservation of all native species within this habitat.

General Objectives

1. *Protect and maintain high priority habitats.*

Strategy	Task
Identify priority habitats for protection.	- Identify and characterize (habitat size, quality, and ownership) of all potential habitat patches, using GIS (PIF Plan for Physiographic Area 28) - Designate important breeding areas under Important Bird Area program (PIF Plan for Physiographic Area 28) - Identify specific threats at occupied sites (PIF Plan for Physiographic Area 28) - If declines in breeding habitat availability or Bicknell's Thrush populations are documented, initiate programs to implement habitat protection strategies (PIF Plan for Physiographic Area 28) - Initiate efforts to "officially" recognize Bicknell's Thrush and mountaintop habitat as a high conservation priority in public agency and private land-use planning efforts (PIF Plan for Physiographic Area 28)

2. Maintain or enhance populations of high priority species.

Strategy	Task
Monitor populations of focal species and species from the suite to determine population sizes, statuses, and trends.	- Complete on-the-ground inventories to determine numbers of breeding Bicknell's Thrush at all occupied sites (PIF Plan for Physiographic Area 28) - Initiate research on reproductive success of focal species into ongoing studies of forest health, in relation to pollution and development (PIF Plan for Physiographic Area 28)

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
Bicknell's Thrush	BCR 14 Highest Priority; PIF Continental Watch List; Special Concern in Canada, VT, ME, NY, NH. Uncertain population trend in BCR 14 >90% of population	Reduce threats from: global climate change, environmental contaminants (mercury), breeding habitat loss (communication towers, ski areas, wind power turbines), winter habitat loss, and industrial forest practices Maintain existing range of breeding habitat (BCR 14 Workshop)	Expand existing monitoring practices for high elevation species, including monitoring natal dispersal of BITH (BCR 14 Workshop) Analyze existing data to evaluate population changes (BCR 14 Workshop) Evaluate significance of contaminant exposure (mercury) on BITH (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	breeds in BCR 14 <u>Population Objective:</u> Increase population stability and overall numbers within BCR by 10% (PIF) See Population Estimates table for numerical estimates and objectives	Secure habitat protection for core breeding areas in Maine and Canada, secure stewardship and management agreements with industrial forest managers (PIF Plan for Physiographic Area 28 and BCR 14 Workshop) Develop policies and measures that would protect and enhance wintering habitat as the mitigation “cost” for development projects in the US (BCR 14 Workshop) Develop management plans and formal protection measures for core wintering areas (BCR 14 Workshop) Habitat restoration and creation of buffer zones around important habitat on the wintering grounds (BCR 14 Workshop)	Initiate a Population Viability Analysis for BITH (BCR 14 Workshop) Model potential consequences of climate change (BCR 14 Workshop) Determine demographics and reproductive success rates within industrial forest landscape (BCR 14 Workshop) Examine habitat segregation between males and females on the wintering grounds (BCR 14 Workshop) Expand monitoring efforts throughout wintering range (BCR 14 Workshop) Determine distribution and habitat use in Cuba, Haiti, and Jamaica (BCR 14 Workshop) Use BITH as an umbrella species to educate public about conservation needs of migratory species and international conservation issues (BCR 14 Workshop) Educate recreational users of montane forests about BITH conservation (BCR 14 Workshop)
Purple Finch	See Coniferous Forest for Objectives		

Shrub / Early Successional Forest

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Woodcock	1	X			Chestnut-sided Warbler	2	X		
Blue-winged Warbler	2	X			Olive-sided Flycatcher	2	X		

Issues:

Natural disturbance was undoubtedly responsible for maintaining local areas of early successional habitat, following severe storms, landslides, beaver activity, or fire. These areas probably were important in sustaining populations of priority bird species, and they remain important today, especially in portions of physiographic area that are exempt from timber harvest. Other early successional habitats are created or maintained through the processes of agricultural abandonment and silviculture. Regenerating forests created through silvicultural practices are an important component of the landscape on extensive areas owned by private timber companies. Many species of birds associated with this habitat have been experiencing steep population declines in the Northeast over the last several decades, including in Maine. While many of these species are still fairly widespread and common, these steep declines warrant attention. (PIF)

Threats:

- Urban/suburban development
- Lack of adequate disturbance events in remaining forested areas
- Commercial timber harvests of extremely large cuts resulting in huge blocks of a single age class
- Habitat loss on migration and wintering grounds

Goal:

Conserve, restore and enhance populations of focal species in shrub / early successional habitat to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. *Protect and maintain high priority habitats. (Refer to PIF Physiographic Area 9 plan for a comprehensive discussion on management and implementation strategies.)*

Strategy	Task
Identify and protect high priority habitat.	• Research best method of protection—acquisition, fee or easements from willing sellers • Identify powerline rights-of-way to be managed to provide habitat for shrubland birds. (PIF) • Work with private forest owners to promote cutting smaller blocks in a shifting mosaic framework rather than extremely large clearcuts • Work with forest owners to promote leaving some patches of older trees throughout

	clearcuts to enhance diversity of bird use
Maintain, manage and monitor priority habitats already protected.	• Sustain habitat through collaborative management of areas that already are subjected to frequent human disturbance from agriculture, forestry, or the maintenance of roads and rights-of-way. (PIF) • Coordinate habitat protection of areas already owned by federal, state, local government or NGO's. (BCR 30 workshop) • Compare early successional habitats resulting from natural disturbances vs. forestry practices vs. power line rights-of-way with regard to suitability for high-priority species, including breeding densities and nesting success. (PIF) • Determine if there is relationship between patch size and nesting success for shrubland birds, and between patch size and breeding density for the more area sensitive species. (PIF) • Continue clearcutting as a management as a means of providing shrub habitat on state forests. (PIF) • Implement careful planning of rotational harvest schedules. (PIF) • Maintain right-of-ways by selectively spraying herbicide on the base of tall-growing trees. (PIF)

2. Maintain or enhance populations of high priority species.

Strategy	Task
Utilize existing programs to increase populations of shrubland species.	• Increase utilization of Farm Bill programs to benefit priority shrubland birds. • Expand traditional game management in early successional habitats to include nongame bird priorities and objectives; including evaluation of effects of traditional game management on priority nongame species (PIF)
Monitor species to determine population size, status and trends.	• Develop a targeted monitoring program for high priority species. Coordinate with PIF projects. (BCR 30 workshop) • Research/monitoring is needed on effects of cowbird parasitism on shrubland birds. (PIF) • Determine effects of woodcock habitat management techniques on other priority, early-successional bird species. (PIF) • Develop targeted monitoring/research program on demographics and habitat-area relationships for priority shrubland birds

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Woodcock	Estimated population of 523,000 in Maine High responsibility: 19.3% of the breeding population in BCR 14. Declining BBS trend in BCR 14 (-6.3% /year) between 1966-1999 Maine population declines 2.2% / year between 1968-2001 <u>Population Objective:</u> Halt population decline by 2012 and see increase by 2022 to levels documented in 1970's (measured by singing ground surveys)	Reduce threats from: habitat loss and degradation on breeding, migrating, and wintering grounds, forest maturization, adult mortality rates (weather, predation, and harvest), and contaminants Intensive forest management (clear-cutting, heavy partial cuts, and fuel wood harvesting) and the increasing harvest of early successional hardwoods may enhance habitat for woodcock Cuts should be planned to take advantage of moisture gradients (i.e., cut along moisture gradient) Log landings or semi-permanent openings scattered through cuts would serve as singing grounds	Need to monitor recruitment levels using harvest surveys (BCR 14 Workshop) Need to assess singing ground surveys for accuracy, but continue monitoring effort (BCR 14 Workshop) Evaluate effects of contaminant exposure (BCR 14 Workshop) Provide technical assistance to landowners (industrial and non-industrial) on life history requirements of woodcock (BCR 14 Workshop)
Blue-winged Warbler	BCR objective is to increase population by 50% (PIF) See Population Estimates table for numerical estimates and objectives		
Chestnut-sided Warbler	Decreasing BBS trend in BCR 14 (-1.54 % / year between 1966-1999) but still widespread <u>Population Objectives:</u> Increase population by 50% (PIF)	Threats: Limited and declining early successional/edge habitat; predation; housing developments. Maintain and increase early successional habitat, especially on private and industrial forest lands (BCR 14 Workshop)	Investigate population demographics in different early successional habitats (edge vs clearcut), including evaluation of reproductive success for birds nesting in these areas (BCR 14 Workshop) Determine minimum patch size required for stable population (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
	See Population Estimates table for numerical estimates and objectives		Develop management prescriptions for maintaining suitable early successional habitat for species dependent on this serial stage in the context of ecosystem management (BCR 14 Workshop) Educate public about role of natural disturbances in forest management, and the dependency of certain species on this process (BCR 14 Workshop)
Olive-sided Flycatcher	See Coniferous Forest habitat section for specific objectives		

Grasslands / Agriculture

Associated Focal Species:

Species	Priority	B	M	W	Species	Priority	B	M	W
American Golden-Plover	2		X		Canada Goose - NAP	2		X	
American Woodcock	1	X			Ipswich Savannah Sparrow	1	X		
Black-bellied Plover	2		X		Upland Sandpiper	2	X		
Bobolink	2	X			Whimbrel	2		X	

Issue:

Natural grasslands are not a major feature of this region, and it is likely that other naturally occurring openings, such as bogs or wet meadows, have supported some grassland birds over time in this region. Today, agricultural land represents a minor and declining feature of most landscapes in the BCR, with several notable exceptions, such as Prince Edward Island, middle portions of the St. John river valley, and Aroostook County of Maine. However, various conservation plans have identified the need to maintain blueberry barren and agricultural fields to provide breeding habitat for the species listed above. The decline of species associated with open fields is closely correlated with recent trends of increased residential and commercial development and the declining interests in agriculture; each resulting in a reduction of available grasslands, open fields, blueberry barrens, and pastures within the region. In addition to providing breeding habitat, these open fields provide important foraging habitat for migratory birds during spring and fall migration.

Threats:

- Loss of open land associated with declining farm practices including residential development and reversion to forest.
- Habitat Fragmentation
- Agricultural Practices
- Contaminants
- Habitat loss on migration and wintering grounds

Goal:

Conserve, restore and enhance populations of focal species in grasslands and agricultural fields to ensure the overall conservation of all native species within this habitat.

General Objectives:

1. Protect and maintain high priority habitats. (Refer to PIF Physiographic Area 9 plan for a comprehensive discussion on management and implementation strategies.)

Strategy	Task
Identify and protect high priority habitats.	• Identify and protect key areas, especially large grasslands, for immediate conservation efforts. (PIF) • Collect ownership/contact information. • Research best method of protection—acquisition, fee or easements from willing sellers • Further research on different management techniques is needed to understand the appropriateness of prescribed burning, mowing, and other methods for maintaining suitable habitat for Northeastern grassland birds. (PIF) • Determine if differences exist in grassland breeding bird diversity and abundance in the Northeast between warm season and cool season grass types. (PIF) • Promote conservation easements for grasslands, especially in Connecticut River Valley (BCR 14 workshop)
Maintain, manage and monitor priority habitats	• Coordinate with other states to develop and implement a comprehensive grassland management plan for the entire New England region. (PIF) • Consider consolidation of adjacent grassland fields, through the elimination of hedgerows, stone fences, or tree lines, in areas where open land occupies a considerable amount of the surrounding landscape and grassland management can be identified as a reasonable management alternative. (PIF) • Determine if current mixtures of warm season grasses has failed to provide adequate habitat for grassland breeding birds. Focus on cool season grasslands if

	needed. (PIF) • Continue monitoring grassland habitats within the physiographic area as part of a regional effort within New England to better assess grassland bird abundance trends. (PIF) • Develop best management practices and implement integrated management plans for grasslands on civilian and military airfields. (BCR 14 workshop) • Research and develop best management practices for blueberry barrens and conduct outreach to blueberry industry (BCR 14 workshop) • Synthesize and maintain existing regional grassland bird survey data (BCR 14 workshop) • Develop monitoring program for blueberry barrens in Maritime Provinces (BCR 14 workshop) • When managing grasslands, employ best management practices using guidelines in Massachusetts Audubon Society's <i>Conserving Grassland Birds</i> publication (www.massaudubon.org) (MDIFW E&T Handbook) • Manage multiple, contiguous fields to provide a mosaic of grassland types by mowing, burning, or late-season grazing. Mow every 2-5 years to inhibit establishment of shrubs and trees (MDIFW E&T Handbook) • Burn fields every 5-10 years after September 1 or before May 1. Do not burn more than 50% of a grassland within a year. (MDIFW E&T Handbook) • Avoid or minimize herbicide and pesticide applications, or employ integrated pest management techniques (MDIFW E&T Handbook) • Use voluntary agreements, conservation easements, conservation tax abatements and incentives, and acquisition to protect important habitat for grassland nesting species (MDIFW E&T Handbook)
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2. Maintain or enhance populations of high priority species.

Strategy	Task
Monitor populations of focal species to determine population size, status and trends.	• Conduct demographic studies (productivity, survival, dispersal) of priority species to provide information needed for determining causes of population declines and understanding metapopulation dynamics

Species Specific Objectives:

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
American Golden Plover	See Unconsolidated Shore habitat section for specific objectives		
American Woodcock	See Shrub/Early Successional habitat section for specific objectives		
Black-bellied Plover	See Unconsolidated Shore habitat section for specific objectives		
Bobolink	Declining BBS trends in BCR 14 (-2.23% / year between 1966-1999), resulting in >50% decline in population <u>Population Objective:</u> Increase population by 50% (PIF) See Population Estimates table for numeric estimates and objectives	Reduce threats from: changes in agricultural practices, loss of habitat, increasing predation rates due to habitat fragmentation Maintain suitable habitat distributed across the landscape to support viable metapopulation structure (BCR 14 Workshop) Continue efforts to develop grassland management protocol to maintain and enhance nesting habitat for grassland nesting species (BCR 14 Workshop)	Need to conduct Population viability Analysis, investigate metapopulation structure and dynamics (BCR 14 Workshop) Evaluate effects of contaminant exposure on wintering grounds (BCR 14 Workshop) Develop outreach materials which promote grassland management techniques that benefit grassland nesting birds (BCR 14 Workshop) Research effects of mowing and burning practices on reproductive success and predation rates (PIF)
Canada Goose - NAP	Maine population estimate: 8,900 pairs Significant component of migrant population associated with BCR 14 Population is stable 2002 Maine harvest was: 12,800 birds	Conserve significant staging and wintering habitat from habitat degradation (BCR 14 Workshop) Merrymeeting Bay and Scarborough Marsh significant historical stopover site in fall and spring migration. On PEI, continue forms of agriculture beneficial to this population.	Conduct survey to determine status and distribution of population (BCR 14 Workshop) Develop better aging techniques (BCR 14 Workshop) Evaluate effects of aquaculture development and associated human activities on habitat availability (BCR 14 Workshop) Investigate significance of eelgrass declines

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
			on population (BCR 14 Workshop) Continue outreach efforts to inform public of differences between resident and migratory populations (BCR 14 Workshop)
Ipswich Savannah Sparrow	100% of breeding population of this subspecies and much of its wintering grounds occurs in this BCR <u>Population Objective:</u> Increase population to levels observed in 1970's & 1980's (BCR 14 Workshop)	Specific habitat goals for this species will be possible after winter habitat surveys are completed? Continued protection of Sable Island breeding grounds; sea level rise; coastal development in wintering areas along the East Coast. Focus areas include Sable Island, NS and coastal beach areas of New England south to the Carolinas.	Initiate breeding ground surveys(BCR 14 Workshop) Improve techniques to differentiate between Savannah Sparrows during Christmas Bird Counts (BCR 14 Workshop) Initiate efforts to investigate taxonomic status of species, specific wintering microhabitats need better definition (BCR 14 Workshop) Initiate surveys of occupied winter range to identify and evaluate site characteristics (BCR 14 Workshop) Educate coastal beachfront owners about the species' winter habitat needs (BCR 14 Workshop)
Upland Sandpiper	Maine's population is estimated at 148 pairs occupying 59 grassland-barrens and airports	Threats: Largely unknown, habitat loss, adult survival rates, habitat quality and quantity on migratory routes and wintering grounds, and food availability Agricultural practices may be limiting availability of herbaceous cover needed for nesting, and increasing vulnerability to predation (BCR 14 Workshop) Vegetation management efforts have included: periodic mowing or burning	Need to evaluate effects of vegetation management actions (intensity, technique, and frequency) on population (BCR 14 Workshop) Initiate effort to monitor population size and trends, habitat quality, survival rates, and productivity (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Management Objectives	Research & Outreach Objectives
		(every 1-3 years) to promote bunch grasses and forbs, while discouraging encroachment by woody vegetation (MDIFW Species Assessment) Recommended Management Actions Include: (MDIFW Species Assessment) -Avoid mowing and grazing between May 1 – August 5 - Maintain approx. 40% of vegetation at a height of 8-12”, with minimum litter and grass cover. Maintain some patches of bare ground, scattered tall forbs (8-25”), and short shrubs for song perches Blueberry barrens in Hancock and Washington Counties provide primary breeding habitat in Maine. Future availability of this habitat will depend on commercial demand for blueberries	
Whimbrel	See Unconsolidated Shore habitat section for specific objectives		

Urban / Suburban

Associated Focal Species:

Species	Priority	B	M	W
Common Nighthawk	2	X		
Chimney Swift	2	X		

Issues:

Urban/suburban habitat provides suitable habitat for a number of species for which historical habitat(s) have been significantly altered or reduced. (PIF)

Threats:

- Changes in modern building construction
- Use of pesticides for mosquito control

General objectives

Conserve, restore and enhance populations of focal species in urban and suburban areas to ensure the overall conservation of all native species within this habitat.

1. Maintain and enhance populations of high priority species.

Strategy	Task
Monitor populations of focal species to determine population size, status and trends.	• Participate/establish a network of managers, biologists, and researchers are needed across northern New England to more effectively address the needs and coordinate conservation efforts for the high priority urban birds. (PIF) • Surveying efforts, identification of significant breeding locations, and public education/outreach should be coordinated on a regional basis. (PIF) • Develop an appropriate survey method for tracking populations of Chimney Swifts and Common Nighthawks and conduct a thorough status assessment of these species. (PIF) • Understand impacts of pesticides (e.g., urban/suburban mosquito spraying) on this suite of species, including links to the current outbreak of West Nile virus. (PIF) • Compile better life history information on these species, such as kinds of nest predators and levels of nest depredation, breeding longevity and reproductive effort over time, characteristics of preferred nesting requirements, fidelity to breeding and wintering sites, and better assessment of migration routes and destinations. (PIF)

Species Specific Objectives:

Species	Status & Distribution	Habitat/Managemet Objectives	Research & Outreach Objectives
Chimney Swift	Declining BBS trend in BCR 14 (-3.78% / year for 1966-1999) <u>Population Objective:</u> Increase population by 50% (PIF); stabilize population.	Reduce threats from: loss of habitat and nesting structures (chimneys and large trees), potential decline in prey availability due to pesticides, contaminants Work with industrial forest industry to increase number of large trees left after harvesting operations (BCR 14 Workshop)	Develop standardized survey methods for species, as BBS routes do not adequately census this species (BCR 14 Workshop) Determine causes of population declines (BCR 14 Workshop)

Species	Status & Distribution	Habitat/Managemet Objectives	Research & Outreach Objectives
	See Population Estimates tables for numeric estimates and objectives	- Identify key breeding locations area for Chimney Swifts and Common Nighthawks should be identified for immediate conservation efforts. (PIF) - Landowner contacts should be made at each site to encourage proper management for these species. (PIF) - distribute information materials on the use of rooftops and chimneys as nesting sites. (PIF) Develop and implement public education programs to encourage reports of Chimney Swifts; develop urban public education in schools to aid in the monitoring and assessment of populations of these species. (PIF)	
Common Nighthawk	<u>Population Objective:</u> Increase population by 50% (PIF) See Population Estimates table for numeric estimates and objectives	Reduce threats from conversion of urban rooftops from small gravel to other materials, and loss of naturally maintained early-successional habitats (e.g., pine barrens) (BCR 14 Workshop)	Species is not well-sampled by BBS and requires targeted nocturnal surveys in appropriate habitats (including urban areas). (BCR 14 Workshop) Study demographics and micro-habitat selection to better understand limiting factors (BCR 14 Workshop) Educate groups working on urban revitalization and urban wildlife about the issue of the nighthawk decline, and encourage changes in roof construction where feasible. (BCR 14 Workshop)

Appendix E, Part 2. DRAFT population and habitat objectives for highest priority, high priority, and selected moderate priority landbird and waterfowl species and their associated priority habitat types in BCR 14.

These estimates and objects are broken down, where possible, to the portions of BCR 14 within each state and province to provide an indication of each jurisdiction's responsibility for meeting the overall BCR objective. The following table provides estimates and objectives for breeding season populations and habitat, unless otherwise noted. Habitat objectives are reported as estimates of how much of that habitat type would be needed, given a stated breeding density, to support the population objective for each priority species. Blank cells in the following table indicate insufficient information to generate an estimate or set an objective at this time.

The waterfowl and landbird population estimates and objectives were stepped down from the appropriate continental-level conservation plans. Descriptions of the methods used to generate these numbers are included in [Part 3](#) (for waterfowl) and [Part 4](#) (for landbirds) of this appendix. These estimates should be considered very preliminary and in need of review, and might best be thought of in terms of relative estimates of population sizes for comparing among species and for tracking relative population size over time. Better population size data within jurisdictions undoubtedly exists for some species and can be incorporated through reviewers' comments into future versions of this document.

Where standard errors are reported for current population estimates, these numbers reflect variance in the number of birds counted among BBS routes. The standard errors do not incorporate variance associated with errors in distance, pair, or time correction factors (see description in [Part 4](#)). The BCR population objectives for waterfowl represent initial draft recommendations from stepping continental-level objectives down to the BCR level. For landbirds, the BCR population objectives reflect a uniform step-down across all BCRs of continental-level objectives from Rich et al. (2004), which are based entirely on continental-level population trends. Alternative methods for developing population objectives, including consideration of continental objectives in conjunction with an assessment of regional population trends, regional trends in habitat availability, and the % population parameter, should be evaluated to see if they provide objectives that are consistent with common knowledge of these species while still resulting in regional objectives that can be added up to meet the continental goals. The numerical Population Targets were calculated by multiplying the current population estimate by the population objective.

Habitat objectives were calculated by multiplying the Population Target by an average breeding density as reported from published studies, often as summarized in the Birds of North America series, as reported in Gauthier and Aubry (1996), or as reported in Hagan et al. (1997). Because habitat objectives were calculated in this manner, these objectives represent the amount of habitat that would be required to support the number of individuals indicated by the Population Target if all of the habitat was of sufficient quality to support a species at the average breeding density reported. Since the breeding densities reported in the literature are often collected on relatively small study plots, they are not necessarily good indicators of true landscape-level densities, although sources such as Hagan et al. (1997) provide estimates that might more closely reflect landscape-level densities. Thus, the habitat objectives may not represent the absolute

amount of habitat needed to support the population target, but rather a hypothetical amount of relatively high quality habitat that could sustain relatively high breeding densities of a given species. The lower the average overall quality of the habitat is across a BCR, the larger the total amount of habitat that will be needed to meet the population target. In reality, the amount of habitat needed to support a population target will vary with a number of factors, including the quality of the habitat. For most species on the priority list, we do not know if breeding habitat is the primary limiting factor, therefore, we cannot assume that if the amount of habitat prescribed in the objective is available or becomes available within the region, then the population target will be reached. Therefore, note that a habitat objective is only intended to suggest how much habitat would be needed to support the population target, given a certain breeding density.

Habitat Type Species Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
Marine Open Water – nearshore				
<i>Red-throated Loon</i> BCR 14	10,000nb	Maintain current pop.		
<i>Red-necked Grebe</i> BCR 14	10,000-100,000nb	Maintain current pop.		
<i>Red Phalarope</i> Western Hemisphere	1,000,000	Maintain current pop.	1,000,000	
Estuaries and Bays				
<i>Greater Scaup</i> BCR 14		47,020 ^a nb		
<i>Horned Grebe</i> BCR 14	100,000- 1,000,000nb	Maintain current pop.		
<i>Red-necked Phalarope</i> Western Hemisphere	2,500,000	Increase ^a objective is for both scaup species combined	5,000,000	
Rocky Coastline (including islands and cliffs)				
<i>Great Cormorant</i> BCR 14	12,300	Maintain current pop. (above min.)		

Habitat Type Species Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
<i>Northern Gannet</i> BCR 14	107,600	Maintain current pop. (above min.)	96,800- 118,400	
<i>Common Tern</i> BCR 14	127,500	Increase	??	
<i>Roseate Tern</i> BCR 14	6,900	Maintain current pop. (above min.)	6,200-7,600	
<i>Arctic Tern</i> BCR 14	19,100	Increase	??	
<i>Razorbill</i> BCR 14	15,200	Increase	??	
<i>Black Guillemot</i> BCR 14	25,100	Maintain current pop. (above min.)	22,600-27,600	
<i>Herring Gull</i> BCR 14	278,500	Maintain current pop. (below max.)	250,700- 306,400	
<i>Leach's Storm-petrel</i> BCR 14	220,700	Increase	343,600- 420,000	
<i>Black-legged Kittiwake</i> BCR 14	108,700	Maintain current pop. (above min.)	35,700- 165,800	
<i>Atlantic Puffin</i> BCR 14	2,900	Increase	3,200-3,900	
<i>Purple Sandpiper</i> Western Hemisphere	16,000	Maintain current pop.	16,000	
<i>Ruddy Turnstone</i> Western Hemisphere	235,000	Maintain current pop.	235,000	

**Unconsolidated
Shore, including
beach and mudflats**

Piping Plover

Habitat Type Species Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
Atlantic Coast ssp. Semipalmated Sandpiper	2,600	Increase	4,000	
Western Hemisphere Black-bellied Plover	1,600,000	Increase	3,750,000	
Western Hemisphere American Golden- Plover	120,000	Increase	218,200	
Western Hemisphere Red Knot <i>rufa</i> subspecies Whimbrel	150,000	Increase	??	
Western Hemisphere Short-billed Dowitcher	85,000	Increase	120,000	
Western Hemisphere Hudsonian Godwit	50,000	Increase	131,000	
Hudson Bay pop. Semipalmated Plover	300,000	Need objective	??	
Western Hemisphere	45,500	Maintain current pop.	45,500	
American Oystercatcher	150,000	Maintatin current pop.	150,000	
Western Hemisphere Sanderling	7,500	Need objective	??	
Western Hemisphere Least Sandpiper	200,000	Increase	1,000,000	
Western Hemisphere	600,000	Increase	1,400,000	

**Estuarine Emergent
Saltmarsh**

Maintain existing
amounts of saltmarsh

American Black Duck BCR 14		73,520nb		
Mallard BCR 14		7,250nb		
Black-crwned Night Heron BCR 14	12,000	Increase	16,000-19,600	
American Bittern BCR 14	Need estimate	Increase	??	
Yellow Rail BCR 14	Need estimate	Maintain	??	

Habitat Type <i>Species</i> Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
current pop.				
Willet				
Western Hemisphere	250,000	Maintain current pop.	250,000	
Nelson's Sharp-tailed Sparrow				
BCR 14	49,940 $\pm$ 9,610	Maintain current pop.	49,940	
Nova Scotia	21,583 $\pm$ 14,079		21,583	
New Brunswick	13,854 $\pm$ 7,661		13,854	
PEI	11,521 $\pm$ 10,322		11,521	
Maine	10,000 $\pm$??		10,000	
Quebec	2,982 $\pm$ 2,331		2,982	
Freshwater Wetlands, including lakes, rivers, forested wetlands, shrub wetlands, and bogs				
			Maintain existing amounts of freshwater wetlands	
Common Loon	5,900	Increase 15%	6,785	
BCR 14				
Rusty Blackbird				@ density of 10 ha/pair ^a :
BCR 14	38,133 $\pm$ 8,734	Increase 100%	76,266	381,330
Quebec	24,713 $\pm$ 24,00		49,427	247,130
Nova Scotia	6,731 $\pm$ 1,758		13,461	67,310
New Brunswick	3,053 $\pm$ 1,344		6,106	30,530
Maine	1,907 $\pm$ 793		3,813	19,070
PEI	981 $\pm$ 883		1,961	9,810
New York	397 $\pm$ 196		793	3,970
New Hampshire	239 $\pm$ 195		479	2,390
Vermont	113 $\pm$ 78		226	1,130
Bald Eagle				
BCR 14	2,414 $\pm$ 826	Maintain current pop.	2,414	Maintain current habitat
Nova Scotia	2,083 $\pm$ 623		2,083	
New Brunswick	229 $\pm$ 136		229	
Maine	70 $\pm$ 35		70	
New Hampshire	32 $\pm$ 32		32	
New York	??		??	

Habitat Type <i>Species</i> Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
<i>Palm Warbler</i>				
BCR 14	373,821 $\pm$ 38,153	Maintain current pop.	373,821	Maintain current habitat
Nova Scotia	284,297 $\pm$ 78,176		284,297	
Maine	45,112 $\pm$ 13,558		45,112	
New Brunswick	42,769 $\pm$ 19,730		42,769	
Quebec	1,643 $\pm$ 1,643		1,643	
<i>Yellow-bellied Flycatcher</i>				
BCR 14	438,207 $\pm$ 24,910	Maintain current pop.	438,207	Maintain current habitat
New Brunswick	190,570 $\pm$ 38,623		190,570	
Nova Scotia	140,527 $\pm$ 46,031		140,527	
Quebec	48,439 $\pm$ 18,372		48,439	
Maine	47,632 $\pm$ 13,225		47,632	
New Hampshire	6,014 $\pm$ 3,374		6,014	
New York	3,833 $\pm$ 1,781		3,833	
PEI	798 $\pm$ 479		798	
Vermont	393 $\pm$ 277		393	
<u>Deciduous and Mixed Forest</u>				
<i>Canada Warbler</i>				@ density of 5.6 ha/pair ^b
BCR 14	181,774 $\pm$ 5,956	Increase 50%	272,660	763,451
New Brunswick	58,421 $\pm$ 11,459		87,630	245,367
Maine	46,014 $\pm$ 5,294		69,020	193,259
Nova Scotia	23,631 $\pm$ 4,834		35,450	99,249
Quebec	22,392 $\pm$ 6,183		33,590	94,046
New York	13,893 $\pm$ 3,439		20,840	58,349
Vermont	7,583 $\pm$ 1,594		11,375	31,850
New Hampshire	7,004 $\pm$ 2,003		10,505	29,417
Massachusetts	2,621 $\pm$ 718		3,930	11,007
PEI	215 $\pm$ 130		325	904
<i>Wood Thrush</i>				@ density of 5.0 ha/pair ^c
BCR 14	974,710 $\pm$ 23,248	Increase 50%	1,462,100	3,655,163
Maine	306,497 $\pm$ 37,964		459,750	1,149,363
New York	216,346 $\pm$ 20,133		324,520	811,300
Vermont	161,592 $\pm$ 18,528		242,390	605,970

Habitat Type Species	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
Geographic Area				
New Hampshire	133,940 $\pm$ 17,493		200,910	502,273
Massachusetts	71,021 $\pm$ 9,476		106,530	266,328
Quebec	47,761 $\pm$ 16,197		71,640	179,105
New Brunswick	24,234 $\pm$ 8,236		36,350	90,878
Connecticut	12,211 $\pm$??		18,320	45,790
Nova Scotia	1,108 $\pm$ 710		1,660	4,155
<i>American Redstart</i>				
BCR 14	4,197,890 $\pm$ 88,680	Maintain current pop.	4,197,890	Maintain current habitat
New Brunswick	1,284,506 $\pm$ 133,491		1,284,506	
Quebec	875,676 $\pm$ 158,892		875,676	
Nova Scotia	711,262 $\pm$ 100,168		711,262	
Maine	644,964 $\pm$ 45,758		644,964	
New York	272,284 $\pm$ 41,986		272,284	
Vermont	142,030 $\pm$ 20,078		142,030	
New Hampshire	137,854 $\pm$ 20,372		137,854	
Massachusetts	69,842 $\pm$ 11,581		69,842	
PEI	42,124 $\pm$ 15,730		42,124	
Connecticut	12,348 $\pm$??		12,348	
<i>Black-throated Blue Warbler</i>				
BCR 14	565,679 $\pm$ 1,674	Maintain current pop.	565,679	Maintain current habitat
Maine	173,062 $\pm$ 19,768		173,062	
New York	124,901 $\pm$ 20,138		124,901	
Quebec	64,758 $\pm$ 10,477		64,758	
New Brunswick	59,714 $\pm$ 13,223		59,714	
Vermont	53,201 $\pm$ 8,715		53,201	
New Hampshire	47,426 $\pm$ 11,409		47,426	
Massachusetts	23,225 $\pm$ 5,868		23,225	
Nova Scotia	17,586 $\pm$ 7,430		17,586	
Connecticut	1,805 $\pm$??		1,805	
<i>Eastern Wood-Pewee</i>				@ density of 5.0 ha/pair ^a
BCR 14	217,230 $\pm$ 5,755	Increase 50%	325,850	814,610
Maine	68,685 $\pm$ 7,468		103,025	257,568
New Brunswick	34,886 $\pm$ 6,340		52,325	130,823
Nova Scotia	31,388 $\pm$ 7,243		47,080	117,705
New Hampshire	18,848 $\pm$ 3,818		28,275	70,678
New York	17,038 $\pm$ 3,307		25,550	63,890

Habitat Type <i>Species</i> Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
Vermont	16,590 $\pm$ 3,673		24,885	62,213
Quebec	15,924 $\pm$ 3,312		23,885	59,713
Massachusetts	8,412 $\pm$ 2,415		12,620	31,545
PEI	3,921 $\pm$ 879		5,880	14,705
Connecticut	1,539 $\pm$??		2,310	5,773
Veery				
				@ density of 6.0 ha/pair ^c
BCR 14	2,059,127 $\pm$ 42,241	Increase 50%	3,088,690	7,721,725
Maine	564,228 $\pm$ 47,040		846,342	2,115,855
New Brunswick	461,210 $\pm$ 69,428		691,815	1,729,538
Quebec	398,873 $\pm$ 57,361		598,309	1,495,773
New York	195,993 $\pm$ 21,310		293,989	734,973
Vermont	158,767 $\pm$ 15,692		238,151	595,378
New Hampshire	142,725 $\pm$ 10,419		214,087	535,218
Nova Scotia	80,809 $\pm$ 17,274		121,213	303,033
Massachusetts	49,343 $\pm$ 4,348		74,014	185,035
Connecticut	6,496 $\pm$??		9,745	24,363
PEI	683 $\pm$ 496		1,025	2,563
Yellow-bellied Sapsucker				
				@ density of 8.0 ha/pair ^b
BCR 14	1,317,229 $\pm$ 39,914	Increase 10%	1,448,952	5,795,808
New Brunswick	380,751 $\pm$ 76,934		418,826	1,675,304
Maine	375,124 $\pm$ 37,130		412,636	1,650,544
New York	231,367 $\pm$ 51,321		254,503	1,018,012
Nova Scotia	97,137 $\pm$ 24,226		106,850	427,400
Quebec	73,629 $\pm$ 18,133		80,992	323,968
Vermont	72,974 $\pm$ 10,911		80,272	321,088
New Hampshire	43,930 $\pm$ 8,674		48,323	193,292
Massachusetts	37,534 $\pm$ 13,322		41,287	165,148
Connecticut	3,884 $\pm$??		4,272	17,088
PEI	900 $\pm$ 551		989	3,956

Coniferous Forest

				@ density of 4.8 ha/pair ^b
Bay-breasted Warbler				
BCR 14	348,602 $\pm$ 22,783	Increase 50%	522,903	1,254,967
New Brunswick	194,466 $\pm$ 53,315		291,700	700,080
Quebec	60,788 $\pm$ 16,334		91,181	218,834
Maine	56,402 $\pm$ 11,499		84,602	203,045
Nova Scotia	31,193 $\pm$ 5,602		46,789	112,294
New Hampshire	2,973 $\pm$ 1,514		4,460	10,704

Habitat Type	Current Population	BCR	Population	BCR Habitat
Species	Estimate	Population	Target	Objective
Geographic Area	(individuals $\pm$ SE)	Objective	(individuals)	(hectares)
PEI	1,512 $\pm$ 591		2,268	5,443
New York	1,269 $\pm$ 530		1,904	4,570
Canada Warbler Population and habitat objectives for this species are shared with Deciduous and Mixed Forest habitat types				
Boreal Chickadee				@ density of 10.0 ha/pair ^a
BCR 14	193,989 $\pm$ 9,742	Increase 100%	387,979	1,939,895
Nova Scotia	74,177 $\pm$ 15,977		148,354	741,770
Quebec	44,013 $\pm$ 11,152		88,025	440,125
New Brunswick	34,011 $\pm$ 10,712		68,021	340,105
Maine	31,707 $\pm$ 9,270		63,415	317,075
PEI	7,448 $\pm$ 1,784		14,896	74,480
New Hampshire	1,649 $\pm$ 1,518		3,299	16,495
New York	846 $\pm$ 498		1,693	8,465
Vermont	138 $\pm$ 138		276	1,380
Cape May Warbler				@ density of 5.0 ha/pair ^a
BCR 14	172,084 $\pm$ 8,008	Maintain current population	172,084	430,210
New Brunswick	53,488 $\pm$ 8,893		53,488	
Maine	44,052 $\pm$ 9,264		44,052	
Quebec	43,780 $\pm$ 13,366		43,780	
Nova Scotia	22,230 $\pm$ 5,865		22,230	
PEI	5,926 $\pm$ 4,409		5,926	
New York	1,197 $\pm$ 628		1,197	
New Hampshire	1,173 $\pm$ 730		1,173	
Vermont	238 $\pm$ 238		238	
Olive-sided Flycatcher				@ density of 10.0 ha/pair ^a
BCR 14	23,589 $\pm$ 1,227	Increase 100%	47,179	235,895
Nova Scotia	7,438 $\pm$ 1,822		14,875	74,375
New Brunswick	5,726 $\pm$ 858		11,453	57,265
Maine	5,435 $\pm$ 1,307		10,869	54,345
Quebec	3,939 $\pm$ 1,798		7,879	39,395
New York	369 $\pm$ 129		739	3,695
Vermont	271 $\pm$ 105		543	2,715
New Hampshire	237 $\pm$ 132		473	2,365

Habitat Type	Current Population	BCR	Population	BCR Habitat
Species	Estimate	Population	Target	Objective
Geographic Area	(individuals $\pm$ SE)	Objective	(individuals)	(hectares)
PEI	174 $\pm$ 124		348	1,740
<i>Purple Finch</i>				@ density of 16.25 ha/pair ^b
<i>BCR 14</i>	408,849 $\pm$ 9,297	Increase 50%	613,274	4,982,851
New Brunswick	98,594 $\pm$ 18,715		147,891	1,201,614
Maine	81,170 $\pm$ 7,058		121,754	989,251
Quebec	76,566 $\pm$ 8,714		114,848	933,140
Nova Scotia	70,707 $\pm$ 8,066		106,060	861,738
New York	40,630 $\pm$ 6,026		60,945	495,178
Vermont	16,878 $\pm$ 4,119		25,317	205,701
New Hampshire	16,651 $\pm$ 3,505		24,976	202,930
Massachusetts	4,455 $\pm$ 1,484		6,682	54,291
PEI	3,200 $\pm$ 1,303		4,800	39,000

Mountaintop Conifer

Bicknell's Thrush

<i>BCR 14</i>	35,000	Increase 10%	38,500
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Shrub / Early Successional

American Woodcock

BCR 14

Chestnut-sided

Warbler

<i>BCR 14</i>	957,135 $\pm$ 19,118	Increase 50%	1,435,700	@ density of 1.8 ha/pair ^b
Maine	274,614 $\pm$ 22,364		411,921	370,729
New Brunswick	134,839 $\pm$ 23,839		202,258	182,032
Nova Scotia	130,589 $\pm$ 20,800		195,884	176,296
New York	126,204 $\pm$ 17,007		189,306	170,375
Vermont	108,535 $\pm$ 13,294		162,802	146,522
Quebec	78,984 $\pm$ 18,016		118,475	106,628
New Hampshire	75,761 $\pm$ 8,176		113,641	102,277
Massachusetts	23,274 $\pm$ 2,447		34,911	31,420
Connecticut	2,397 $\pm$??		3,595	3,236
PEI	1,939 $\pm$ 1,468		2,908	2,617

Habitat Type <i>Species</i> Geographic Area	Current Population Estimate (individuals $\pm$ SE)	BCR Population Objective	Population Target (individuals)	BCR Habitat Objective (hectares)
<i>Blue-winged Warbler</i>				@ density of 2.0 ha/pair ^a
		Maintain current population		
<i>BCR 14</i>	2,440 $\pm$ 247		2,440	2,440
Massachusetts	1,094 $\pm$ 599		1,094	1,094
Connecticut	899 $\pm$??		899	899
New York	243 $\pm$ 243		243	243
New Hampshire	151 $\pm$ 110		151	151
Vermont	53 $\pm$ 53		53	53

Grasslands

<i>Bobolink</i>				@ density of 2.0 ha/pair ^a
<i>BCR 14</i>	1,023,976 $\pm$ 36,518	Increase 50%	1,535,964	1,535,964
Quebec	225,752 $\pm$ 47,389		338,628	338,628
Maine	212,315 $\pm$ 41,254		318,473	318,473
New Brunswick	190,770 $\pm$ 37,570		286,155	286,155
Nova Scotia	161,322 $\pm$ 47,719		241,983	241,983
Vermont	78,867 $\pm$ 14,694		118,301	118,301
PEI	56,570 $\pm$ 24,403		84,855	84,855
New Hampshire	54,538 $\pm$ 10,528		81,807	81,807
New York	26,403 $\pm$ 16,205		39,605	39,605
Massachusetts	17,438 $\pm$ 3,781		26,156	26,156
<i>Northern Harrier</i>				@ density of 100 ha/pair ^a
<i>BCR 14</i>	5,055 $\pm$ 311	Increase 50%	7,583	379,150
Nova Scotia	1,491 $\pm$ 457		2,237	111,850
Quebec	1,446 $\pm$ 351		2,169	108,450
New Brunswick	1,201 $\pm$ 539		1,802	90,100
Maine	347 $\pm$ 131		521	26,050
PEI	254 $\pm$ 187		382	19,100
New York	236 $\pm$ 172		354	17,700
Vermont	68 $\pm$ 41		102	5,100
New Hampshire	11 $\pm$ 11		16	800
<i>Vesper Sparrow</i>				@ density of 4.0 ha/pair ^c
<i>BCR 14</i>	32,178 $\pm$ 7,385	Increase 50%	48,267	96,534
Maine	16,318 $\pm$ 13,454		24,477	48,954
Quebec	11,860 $\pm$ 6,376		17,790	35,580
Nova Scotia	1,386 $\pm$ 1,178		2,079	4,158

Habitat Type	Current Population	BCR	Population	BCR Habitat
Species	Estimate	Population	Target	Objective
Geographic Area	(individuals $\pm$ SE)	Objective	(individuals)	(hectares)
PEI	671 $\pm$ 671		1,006	2,012
Vermont	541 $\pm$ 338		811	1,622
New Brunswick	514 $\pm$ 293		770	1,540
New York	400 $\pm$ 400		599	1,198
Massachusetts	331 $\pm$ 331		496	992
New Hampshire	158 $\pm$ 158		237	474
<i>Barn Swallow</i>				
BCR 14	1,116,698 $\pm$ 25,405	Increase 50%	1,675,048	
Maine	240,339 $\pm$ 23,713		360,508	
New Brunswick	216,743 $\pm$ 30,026		325,115	
Nova Scotia	186,267 $\pm$ 33,672		279,400	
Quebec	171,178 $\pm$ 32,858		256,766	
New York	108,897 $\pm$ 22,663		163,345	
Vermont	98,837 $\pm$ 12,203		148,256	
New Hampshire	63,103 $\pm$ 8,537		94,654	
Massachusetts	23,994 $\pm$ 3,815		35,991	
PEI	6,249 $\pm$ 1,520		9,373	
Connecticut	1,092 $\pm$??		1,639	
<u>Urban/Suburban</u>				
<i>Chimney Swift</i>				
BCR 14	217,801 $\pm$ 7,619	Increase 50%	326,702	
Maine	72,673 $\pm$ 9,877		109,010	
New Hampshire	35,916 $\pm$ 6,633		53,874	
Vermont	31,040 $\pm$ 7,857		46,560	
Quebec	23,075 $\pm$ 11,294		34,613	
New Brunswick	14,383 $\pm$ 3,845		21,575	
Nova Scotia	13,306 $\pm$ 4,591		19,959	
Massachusetts	11,012 $\pm$ 3,693		16,519	
New York	10,230 $\pm$ 1,753		15,344	
Connecticut	6,165 $\pm$??		9,248	
<i>Common Nighthawk</i>				
BCR 14	18,322 $\pm$ 1,941	Increase 50%	27,483	
New Brunswick	8,543 $\pm$ 2,495		12,815	
Nova Scotia	5,738 $\pm$ 2,069		8,607	
Maine	3,488 $\pm$ 1,983		5,232	
Quebec	553 $\pm$ 440		829	

nb = estimated number of non-breeding individuals.

^a breeding density estimate based on numbers reported in the Birds of North America series species accounts. (Poole and Gill eds. The Birds of North America. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.)

^b breeding density estimate based on Hagan et al. (1997. J.Wildl.Manage. 61(3):718-735).

^c breeding density estimate based on The Breeding Birds of Quebec (Gauthier and Aubry, eds. 1996. The Breeding Birds of Quebec:Atlas of Breeding Birds of Southern Quebec. Association quebecoise des groupes d'ornithologues, Province of Quebec Society for the Protection of Birds, Canadian Wildlife Service, Environment Canada, Quebec Region, Montreal).

Appendix E, Part 3. DRAFT Derivation of Regional Waterfowl Population Planning Targets from North American Waterfowl Management Plan (NAWMP) Continental Population Objectives.

Written by Mark Koneff, waterfowl biologist- pilot with the U.S. Fish and Wildlife Service, Division of Bird Habitat Conservation, in Laurel, Maryland.

Introduction

The North American Waterfowl Management Plan (Plan) is predicated on the premise that the cumulative effects of many targeted local-scale management actions will ultimately affect continental waterfowl populations through improvements in recruitment and survival processes. The ultimate objective of Plan management actions is to provide sufficient habitat to maintain continental waterfowl populations at objective levels during periods characterized by “average environmental conditions.”

Joint ventures attempt to utilize the best available quantitative data and expert opinion to develop explicit assumptions about their regional role in sustaining continental waterfowl populations. These assumptions are critical as they provide the foundation for establishing habitat objectives and implementation strategies. In non-breeding joint ventures, particularly those which are important wintering areas, a three-step process has been employed in development and evaluation of habitat objectives and conservation strategies. First, it is necessary to estimate the proportion of continental waterfowl populations which would be expected to occupy a particular joint venture during the non-breeding season, and the duration and timing of that occupancy, when continental populations are at objective levels. This process is often referred to as a “step-down” of continental goals to regional scales. Second, it is the responsibility of the joint venture to explicitly state assumptions about physiological needs of waterfowl during their residency period and about regional factors influencing availability of and access to important resources, assess resource status and trends, and utilize this information to develop habitat objectives and conservation strategies in a landscape context. Lastly, joint ventures seek to evaluate the validity of explicitly-stated assumptions made during planning phases. In joint venture areas where little evidence of resource limitation exists, it may be difficult to evaluate certain primary planning assumptions regarding the role of regional habitats in continental population dynamics, however, many secondary assumptions (e.g., resource availability in particular habitat types, seasonal changes in resource availability, etc.) can be the focus of evaluation efforts to refine habitat objectives and strategies.

The objectives of this analysis were to derive a cohesive set of species-specific regional population planning targets from the continental population objectives of the Plan and assess distributional changes over that past 30 years that might require consideration in setting habitat objectives, to identify potential short-comings in the methodology employed, and to suggest potential remedies for consideration by the Plan Science Support Team (NSST). It is important to note that many factors influence the number of waterfowl that occupy a joint venture in any given year. Some of these factors are not determined by habitat availability and condition within the joint venture. Regional population targets then are best viewed as planning baselines, not as performance metrics.

Methods

I derived species-specific regional population objectives from Plan continental population objectives using a 4 step process. First, I computed the 1970-1979 mean proportion of the total continental (i.e., including the U.S. and Mexico) Mid-winter Inventory (MWI) count occurring in each U.S. state or in Mexico for each species. Second, I computed the 1970-1979 mean proportion of the total U.S. state harvest occurring in each county for each species. Third, I computed a county-level population objective for each species using

$$N_x = \{ \rho_{s_x} * \phi_{cs_x} * O_x \} \text{ OVER } \{0.85\}$$

where, N_x is the derived county-level population objective for species x , ρ_{s_x} is the proportion of the total 1970-1979 MWI count of species x occurring within state s , ϕ_{cs_x} is the proportion of state s 's total 1970-1979 harvest of species x which occurred in the county c , O_x is the 1970-1979 mean continental population estimate (i.e., mean surveyed area estimate plus estimate of un-surveyed area population) for species x from the 1986 Plan, and the constant 0.85 is a conservative correction factor to account for mortality occurring between January and arrival on the breeding grounds. This correction factor was only applied to goose populations for which winter population objectives have been established. For geese I performed 2 separate computations where, O_x was the 2000-2002 mean population estimate or the population objective presented in the draft 2003 Update to the Plan. Because of difficulties in discriminating certain goose species and populations in the MWI database, I combined mean estimates and objectives for "light geese" (i.e., all populations of snow and Ross's geese) and "dark geese" (i.e., all populations of Canada and white-fronted geese).

Lastly, I assigned each U.S. county to a joint venture (Fig. 1) and a Bird Conservation Region (BCR; Fig. 2) based on the proportion of the county in a joint venture or BCR and summed county-level population objectives to derive joint venture and BCR regional population objectives. I then repeated these computations using MWI data from 1990-2002 and county-level harvest estimates from 1990-1999. MWI state total counts were obtained from the U.S. Fish and Wildlife Service (USFWS), Division of Migratory Bird Management, Flyway Representatives. County-level harvest estimates were obtained from the USFWS, Division of Migratory Bird Management, Branch of Harvest Surveys. Mexican MWI data were obtained from the USFWS, Division of Migratory Bird Management, Branch of Migratory Bird

Population Assessment. All computations were performed using the SAS statistical software package and the geographic information system Arc/Info.

Results

Table 1 presents the results of the derivation process for joint ventures based on 1970-1979 MWI and county harvest data. Table 2 presents results of the derivation for joint ventures based on 1990-2002 MWI data and 1990-1999 county harvest data. Tables 3 and 4 present results of the derivation for BCRs. Table 3 presents the derivation for ducks and geese for both the 1970-1979 and 1990-2002 periods where the continental population objective is the figure that is stepped-down. Table 4 presents the derivation for geese only for both the 1970-1979 and 1990-2002 periods where the 2000-2002 mean population estimate is the figure that is stepped-down. The zip file speciesmaps.zip contains shaded maps of county-level population objectives for each species using both the 1970s and 1990-2002 data and are useful in assessing the adequacy of this approach on a species-by-species basis.

Limitations for Specific Species or Species Groups and Solutions

The approach I utilized did not perform well for geese other than brant nor for several ducks including the mottled duck, the whistling ducks, blue-winged and cinnamon teal, and wood ducks.

Geese – Mid-winter counts are biased low for geese in many states since all habitats, particularly upland habitats utilized by foraging geese, are not consistently surveyed by all states. Proportion of goose counts within states, therefore, is likely not a useful correlate of actual goose winter distribution. Another short-coming of this step-down approach for geese is the inability to distinguish certain species and populations in the MWI count and harvest estimate data. This necessitated the combined analysis for “light geese” and “dark geese.” I suggest that a solution to these problems is to rely solely on the county-level harvest estimates to approximate winter distribution. It would then be necessary for joint ventures and the NSST to work with the USFWS and state biologists to estimate the population-specific proportions of the goose harvest in each county. The proportion of the total U.S. harvest of each goose population could then be computed for each county. The product of these proportions and the goose population status and objectives figures from the 2003 Plan Update would equal goose population-specific county objectives. County-level objectives could then be summed to derive regional objectives. Because of the magnitude of the task of estimating population-specific harvest proportions for each U.S. county, I did not attempt to implement this procedure at this point.

Mottled Duck and the Whistling Ducks – This approach did not adequately estimate mottled duck or whistling duck populations in the U.S. For mottled ducks, this was particularly true for Florida where the MWI is known to provide a poor index to abundance for this species. I made no attempt to adjust the process for mottled ducks. For whistling ducks, I used a modified process in which I computed the proportion of the MWI count in Mexico, Texas/Louisiana, and Florida during both the 1970s and 1990s. I then multiplied these proportions by the mean MWI count for the 1970s. Because of the restricted distribution of these species in the U.S., the best approach to setting regional population objectives may be the use of expert opinion.

Blue-winged and Cinnamon Teal – Most blue-winged teal winter in Latin and South America. Significant numbers, however, winter along the U.S. Gulf coast and in Mexico. Also, during the Mid-winter Inventory, blue-winged and cinnamon teal are not distinguished to the

species level, rather their counts are aggregated. I therefore utilized actual estimates of the numbers of blue-winged teal wintering on the Gulf coast and in Mexico and cinnamon teal wintering in the western U.S. and Mexico (Bellrose 1980) to derive regional population objectives. For cinnamon teal Bellrose (1980) reports the estimated proportion of the population wintering in Mexico versus the western U.S (primarily the Central Valley of California). I then multiplied these proportions with the estimated total breeding population reported by Bellrose (1980) and divided by the constant 0.85 to obtain regional population objectives for this species. Bellrose (1980) does not report specific proportions of blue-winged teal wintering on the U.S. Gulf Coast and Mexico so I could not base blue-winged teal regional objectives on the breeding population objective of the Plan. Instead I divided estimated wintering populations in these regions as reported by Bellrose (1980) by 0.85 to obtain the regional objectives for blue-wings.

Wood Duck – The wood duck is not well represented in MWI counts due to its cryptic coloration and use of wooded habitats. To derive regional population objectives for this species, I computed the mean total county-level harvest for all states within the primary and secondary winter range of this species (Bellrose 1980). As suggested for geese above, I assumed that the distribution of harvest at the county-level is a correlate of actual wood duck winter distribution. I computed the county-level objectives for wood ducks as the product of the proportion of county harvest to total harvest for states in the primary and secondary winter range and the continental population estimate for eastern and western populations of wood ducks from the 2003 Update divided by the 0.85 correction factor. County-level population objectives were then summed to derive joint venture and BCR objectives.

Other Limitations and Solutions

Population Objectives versus Total Use-days – The results of this derivation provide non-breeding population objectives in January. More useful in developing habitat conservation objectives would be an assessment of season-long use of regional habitats by waterfowl including birds stopping during migration, but subsequently leaving the region of interest. This total season long use has been termed by some non-breeding joint ventures as “use-days.” Estimation of total use-days has been attempted by some non-breeding joint ventures. For this continental analysis, it may be possible to use the migration chronology curves and migration regions (Fig. 3) in Bellrose (1980) in conjunction with the of species-specific county-level population objectives (which provide an estimate of population size in January) to compute total use-days by species for each county and sum these use-days for joint ventures and BCRs.

Use of Total Seasonal County Harvest Estimates versus Late-winter County Harvest Estimates – Because the data were readily available, I used total seasonal county harvest estimates. This may skew the estimated January distributions since proportional county harvest is the primary determinant of within-state distribution. For instance, I am not particularly familiar with habitats in northeast Texas, but I’m guessing that the large county-level population objectives computed for many of these counties may be reflective of harvest of migrating birds. This would cause problems but in the derivation of regional population objectives in computing total seasonal use-days. This issue, if deemed a significant problem, could be addressed by using only county harvest estimates for the winter period.

Appendix E, Part 4. DRAFT Methods used to estimate landbird population sizes (excerpt from Appendix B of the PIF North American Landbird Conservation Plan [Rich et al. In Press]).

Estimates of global population size were needed for each species of landbird covered by the Plan for several reasons:

- **To score the Population Size factor (PS) in our species assessment.** For this purpose, we needed order of magnitude resolution on population sizes, using to the extent possible a single methodology to give comparable estimates across all species;
- **To provide estimates of “current” population size for each landbird species.** This gives an impression of the size of the landbird resource, and more importantly it emphasizes the magnitude of the task of attaining listed population objectives;
- **To provide a starting point for estimating population sizes in each Bird Conservation Region,** and an understanding of the magnitude of attaining objectives regionally. We emphasize that additional work to check and refine estimates in each Region is highly desirable, because additional population data may be available, different analytical methods may provide more precision at the regional scale, and because assumptions applied at the continental level may need to be revisited within each region.

Population size estimates for the U.S., and for Canada south of the arctic:

We used Breeding Bird Survey data from the 1990s as the basis for population estimates across the U.S. and across Canada south of the arctic (i.e. excluding BCR 3, see next section). BBS-based estimates of abundance were calculated according to the following steps:

- 1) For each BBS route run within acceptable weather conditions, counts were averaged across years to give a single average count for the 1990s for each species recorded on each route.
- 2) In the boreal forest portions of Canada, where BBS routes are widely scattered, routes not run during the 1990s were added to augment geographical coverage, using data from other decades for these routes (boreal routes that were run during the 1990s still provided the bulk of boreal count data, and species counts from those routes were restricted to the 1990s).
- 3) Species counts were averaged across all BBS routes in each geo-political polygon defined by the intersection of a BCR and a province / state / territory – for example, separate averages were calculated for each of the three U.S. states and three Canadian provinces that together comprise the Boreal Hardwood Transition (BCR 12).
- 4) Where a geo-political polygon was not sampled by BBS routes, we assigned averages from adjacent polygon(s) in the same BCR. In the U.S., unsampled polygons were typically smaller than 1,000 km², so this procedure had minimal effect on continental population estimates. In boreal Canada, unsampled polygons were sometimes large (exceeding 100,000

km² in two instances) so that population estimates for boreal BCRs are less likely to be representative of the whole region.

- 5) Indices of abundance were calculated for each geo-political polygon by multiplying average counts per BBS route (from step 4) times area of the geo-political polygon, and dividing by the theoretical area covered by a BBS route (25.1 km², assuming 400m radius around each of the 50 count circles). For example, the index of abundance for Wood Thrushes in the Ontario portion of BCR 12 equals 2.33 birds/route (55 routes sampled in 1990s) x 202,860 km² (area of Ontario in BCR 12) / 25.1 km² (area per BBS route) equals approximately 19,000.
- 6) BCR-wide indices of abundance were calculated by simple addition across all polygons making up each BCR, thus giving a population index for Wood Thrushes in all of BCR 12 of approximately 40,000. (State and province-wide indices of abundance can be calculated in the same manner).
- 7) BCR-wide population indices were converted to population estimates by applying three correction factors (see Rosenberg and Blancher, in press, for more detail on these correction factors):
 - a. Pair correction – indices were multiplied by two on the assumption that typically a single member of a breeding pair is observed during BBS tallies;
 - b. Detection area correction – Most species are not detected out to the full 400m BBS count circle. Each species was placed into one of five detection distance categories, based on presumed effective detection during 3-minute BBS counts: 80m, 125m, 200m, 400m and 800m. Since area of detection increases as the square of detection distance, the detection area correction is then simply the square of the ratio between 400m (theoretical BBS count circle) and species-specific effective distance. For example for Wood Thrush, placed in the 200m class, the population index is multiplied by a detection area correction of 4 (square of 400/200). Note that effective detection distances are intended to incorporate not only the distance at which a species is normally heard and seen, but also the radius of its movement during a 3-minute count period – this is why some wide-ranging species have been assigned an 800m detection distance despite being counted within a 400m BBS circle.
 - c. Time of day correction – Almost all species show a temporal change in detection across the 50 BBS stops, some declining from a dawn chorus, others peaking after sunrise or later in the morning. A time of day correction is applied to the population index to adjust counts to the maximum time of detection. This adjusts for birds not detected at other times of the morning. The correction factor is the ratio of counts at the peak of detection (calculated using a polynomial curve fit to smooth out stop-by-stop variance) relative to the average count over whole BBS routes. Time of day correction factors were calculated from survey-wide BBS stop-by-stop data. For Wood Thrush, whose detectability declines from a peak at BBS stop 1, the time of day correction is 2.30.

For Wood Thrushes, the population estimate for BCR 12 = 40,000 (index from step 6) x 2 (pair correction) x 4 (detection area correction) x 2.30 (time of day correction) = approximately 740,000 breeding individuals.

Population size estimates for arctic Canada (BCR 3):

In the absence of BBS data, we used a combination of Breeding Bird Census (BBC) density estimates (Kennedy et al. 1999) and relative abundance data from the Northwest Territories / Nunavut Bird Checklist Survey

(<http://www.mb.ec.gc.ca/nature/migratorybirds/nwtbcs/index.en.html>) to estimate population size of landbirds in the arctic (BCR 3) portion of Canada, as follows:

- 1) Total landbird density was calculated from BBC data for each of three terrestrial ecozones that make up BCR 3 in Canada (Arctic Cordillera, Northern Arctic and Southern Arctic).
- 2) Total landbird density was split among three classes of landbirds – those likely to be detected at long distances (raptors, ravens), those at intermediate distances (birds of open country) and the rest (birds of woods and scrub).
- 3) Relative abundance of each landbird species was calculated from Checklist data for each of the ecozones and classes of birds above. Checklist data were first screened to remove lists in which all bird species were not recorded, or the observer self-identified as “fair” at species identification, or month was not June or July. Counts per species were averaged across years within sites before further analysis.
- 4) The ratio of BBC density to checklist abundance (density conversion factor) was calculated for each ecozone and class of landbird. The two northern ecozones were collapsed into one due to lack of difference in conversion factors.
- 5) Density conversion factors were applied to checklist abundance data to provide density estimates of each landbird species at 649 sites across the arctic (those in BCR 3 in Canada).
- 6) Bird densities from checklist sites were averaged within each of 30 Arctic ecoregions, then multiplied by size of region to convert to a population estimate for that ecoregion. Estimates for unsampled ecoregions were derived as area-weighted averages from all sampled ecoregions in the same terrestrial ecozone. Population estimates were then summed across ecoregions to provide a total population estimate for each landbird species in the arctic.

Estimating global populations:

For species breeding entirely within the U.S. and Canada, our estimate of global population size was a simple sum of the above two estimates (BBS-based estimate plus arctic Canada estimate).

For species with broader breeding distributions, but still at least 10% of range in the U.S. and Canada, we extrapolated global population size on the basis of proportion of breeding range outside of the U.S. and Canada. Proportions of breeding range were estimated from range maps.

For species with more than 90% of breeding range outside the U.S. and Canada, we estimated global population size to order of magnitude (as for PS scores) based on range size and a comparison to population sizes of other landbird species that were judged to have similar relative abundance.

Exceptions to the methods presented above:

We accepted independent estimates of population size for some landbird species that have been surveyed by other methods more appropriate and specific to the species, for which continental-scale estimates were available or could be guesstimated at a level of accuracy deemed to be superior to our standard estimates.

Some assumptions in estimating population sizes:

For a variety of reasons, the population estimates presented here are rough estimates, and will need to be improved over time, especially for use at smaller scales. Without attempting to be comprehensive, a few main assumptions of the approach are mentioned here (see Rosenberg and Blancher, in press, for more information).

Habitats are sampled in proportion to their occurrence in the regional landscape: Though BBS is designed to provide a random sample of the landscape, limitations of a road-based survey mean that the landscape sampled is a biased representation of available habitat – for example species characteristic of high elevation habitats are likely to be undersampled by BBS simply because roads tend to follow valley bottoms in mountainous regions. In northern BCRs, there is a geographic bias, with most BBS data available from the southern portions of those BCRs. Checklist and Breeding Bird Census sites are determined by individual scientists and volunteers, so are not a random sample of arctic regions. We have not accounted for habitat bias in our continental estimates, in part because it will differ from region to region, and because the magnitude of bias has not yet been estimated in many regions or at a continental scale. Correction for habitat bias should be considered when using the methods described above at smaller scales.

Birds present but not detected during BBS counts are accounted for by one or more of the three density corrections applied above (pair, detection area, and time of day corrections): Species that have a peak of detection outside of the BBS sampling window (e.g. early-season breeders, most nocturnal species) are likely to have been underestimated. Pair corrections may result in over-estimation of population size, if a high proportion of counts involve either both members of a pair, or unmated birds.

Checklist / BBC-derived estimates from arctic Canada are comparable to BBS estimates: There are no BBS data from BCR3 in Canada to test this assumption. However, checklist/BBC-derived landbird density was 79 birds/km² in the Canadian arctic, versus a BBS-derived 127 birds/km² in the BCR 3 portion of Alaska. This difference is in the expected direction, since the Canadian arctic has a larger proportion of high arctic where landbird density is typically low.

Breeding density within the U.S. and Canada is similar to density elsewhere in the breeding range: Extrapolation of population size estimates to global population rely on this assumption, though it does not affect U.S./Canada population estimates, nor population objectives for the U.S. and Canada.

How accurate are the population estimates?:

Measures of precision for population estimates are not presented in the PIF North American Landbird Conservation Plan. Though variance associated with some of the parameters has been measured, others have yet to be estimated. Conversion of BBS relative abundance to estimated density depends on several adjustment factors, each of which carries associated variance. A high proportion of undetected birds, habitat bias and incorrect assignment of detection distance category have potential for large effects on estimates. Nevertheless, comparison with atlas-derived population estimates suggests that population sizes are still well within the correct order of magnitude for landbirds regularly encountered on BBS routes (Rosenberg and Blancher, in press). Additional comparisons will be useful for refining the estimates.

Estimates of percent of global population:

Estimates of the percent of global population within BCRs and biomes were needed to assign BCRs to avifaunal biomes, to identify Stewardship Species in those biomes, to construct maps weighted by proportion of population in avifaunal biomes, and to provide an indication of degree of regional responsibility for Watch List and other species.

A. Breeding season:

For the breeding season, estimates of proportion of global population were calculated by dividing regional population estimates by global population estimates.

B. Winter percents:

For resident species, we assumed percent of global population was the same as in the breeding season. For migratory species, we based our estimates for the U.S. and Canada on Christmas Bird Count (CBC) data, calculated as follows:

- 1) For each CBC count circle surveyed between 1990/91 and 1997/98, birds observed per 100 party-hours were calculated and then averaged across years to give a single effort-adjusted count per species per count circle.

- 2) Effort-adjusted counts were averaged across all CBC count circles in each geo-political polygon defined by the intersection of a BCR and a province / state / territory. These average effort-adjusted counts were then multiplied by area of the geo-political polygon to yield an abundance index for each species in the polygon.
- 3) Abundance indices were summed across polygons within BCRs to give an abundance index for each BCR. Where a geo-political polygon was not sampled by CBC sites, an area-weighted average from other polygons in the same BCR was assigned. Most geo-political polygons without CBC count circles were in the boreal forest or arctic, where relatively few landbird species spend the winter.
- 4) Percent of U.S. and Canada winter population was then calculated for each BCR by dividing BCR abundance indices (from step 3) by the sum of all BCR indices across the U.S. and Canada.
- 5) Percent of global winter population was estimated in the same manner as summer population estimates, using proportion of winter range to estimate proportion of global range in the U.S. and Canada.

Some assumptions in estimating percent of population:

Habitat bias is consistent across the survey area: Because estimates of percent are relative measures, they are much less affected by habitat bias and density corrections than are population estimates, as long as biases are relatively consistent across the survey area. Thus percent of population based on CBC circles can be reasonably accurate despite strong potential for bias in the non-random placement of circles.

Differences in effort among CBC counts can be standardized by dividing by party-hour: In fact, species will respond differently to different types of effort (party-hour, party-mile, feeder counts, nocturnal effort). Also, response to increasing effort is likely to be non-linear, eventually becoming asymptotic. However, estimates of percent of winter population by BCR or avifaunal biome were relatively insensitive to these issues. Comparison of percents of winter population were similar whether calculated without any effort correction, correcting with party-miles, or using party-hours to correct effort. Only for a few northern species were there important differences depending on which method of error correction was used.

Appendix F. BCR 14 Habitat Focus Area maps and data sheets.

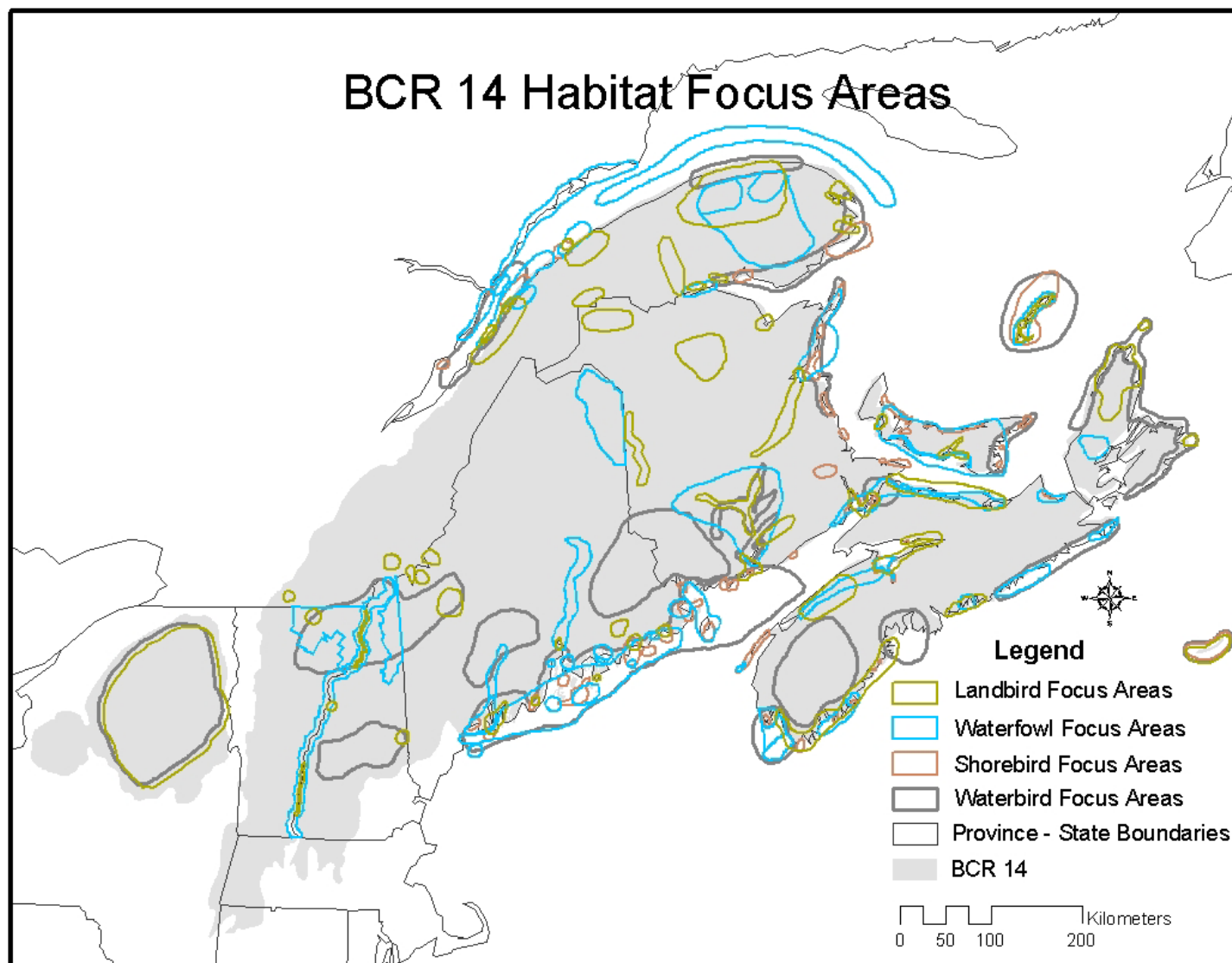


Fig. 8. Map of all habitat focus areas in BCR 14, illustrating areas of overlap among focus areas for two or more taxonomic groups. For more details, see [Waterbird Focus Areas](#), [Landbird Focus Areas](#), [Waterfowl Focus Areas](#), and [Shorebird Focus Areas](#).

Waterbird Focus Areas

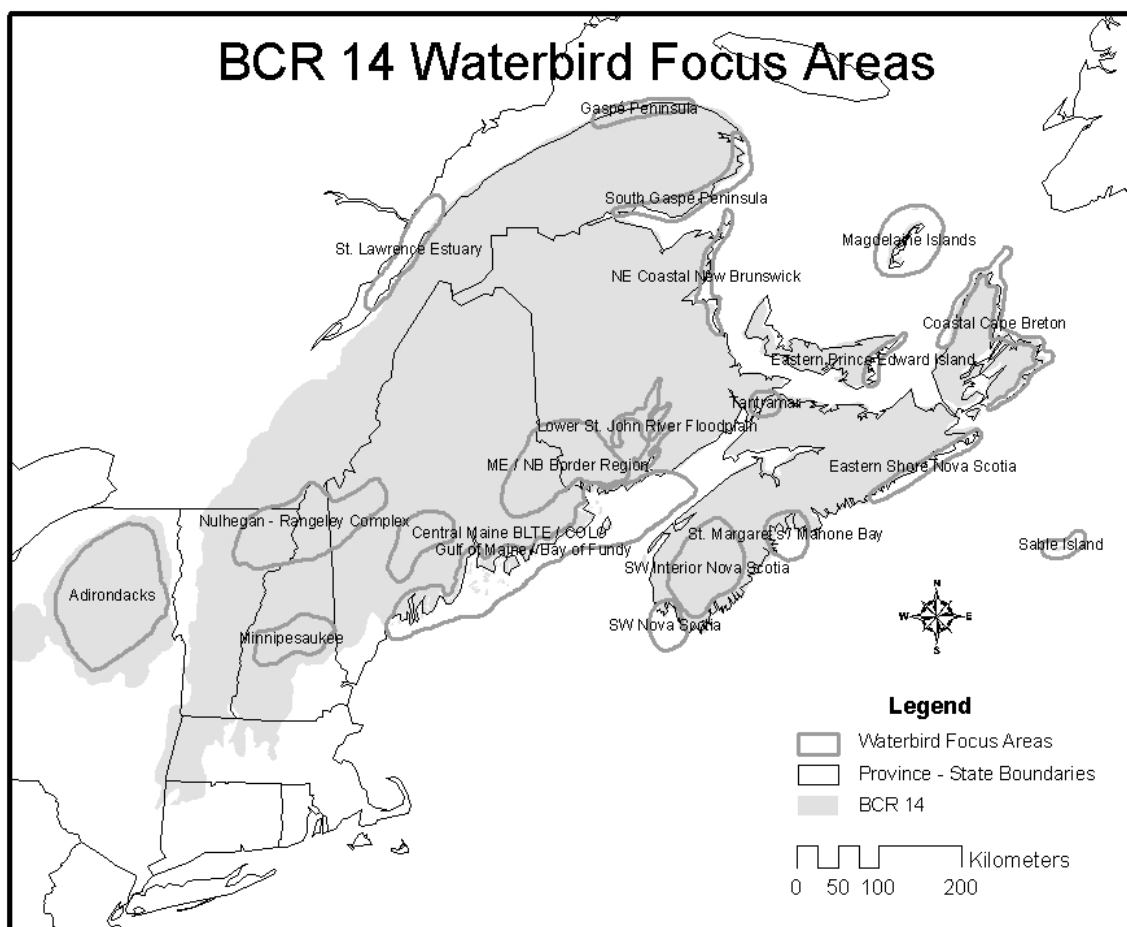


Fig. 9. Map of waterbird focus areas (outlined in dark gray) in BCR 14. See the following page for a list of focus areas by province/state and links to data sheets for all focus areas.

Waterbird Focus Areas in Quebec include: [St. Lawrence Estuary](#), [North Gaspé Peninsula](#), [South Gaspé Peninsula](#), and [Magdalen Islands](#).

Waterbird Focus Areas in New Brunswick include: [Northeastern Coastal New Brunswick](#), [Tantramar](#), [Lower St. John River Flood Plain](#), [Maine/New Brunswick Boarder Region](#), and [Gulf of Maine/Bay of Fundy](#).

Waterbird Focus Areas in Prince Edward Island include: Eastern PEI (no data sheet) and [Western PEI](#) (not identified on map).

Waterbird Focus Areas in Nova Scotia include: [Tantramar](#), [Coastal Cape Breton](#), [Eastern Shore Nova Scotia](#), [St. Margaret's/Mahone Bay](#), [Southwest Interior Nova Scotia](#), [Southwest Nova Scotia](#), and [Sable Island](#).

Waterbird Focus Areas in Maine include: [Maine/New Brunswick Boarder Region](#), [Gulf of Maine/Bay of Fundy](#), [Central Maine Black Turn/Common Loon Areas](#), and [Nulhegan/Rangeley Complex](#).

Waterbird Focus Areas in New Hampshire and Vermont include: [Nulhegan/Rangeley Complex](#) and [Winnipesaukee](#).

Waterbird Focus Areas in New York include: [Adirondack Park](#).

Name of focus area (with coordinates)	St. Lawrence Estuary
State(s), Province(s)	Quebec
Site description	Rocky islands and coastline
Importance to this bird group	Razorbill, Black Guillemot, Black-legged Kittiwake, Virginia Rail, Sora, Black-crowned Night Heron
Importance to other bird groups	
Current and potential Threats	• Oil spills • Disturbance (kayakers, boat traffic) • Fox predation
Protected status or area designation	Many islands are part of the National Wildlife Area (NWA)
Conservation action needed	Fox control
References	
Key contacts (e-mail)	<Gilles.Chapdelaine@ec.gc.ca> <Jean-Francois.Rail@ec.gc.ca>

Name of focus area (with coordinates)	North Gaspé Peninsula
State(s), Province(s)	Quebec
Site description	Coastline and Cliffs
Importance to this bird group	Black Guillemot (1,000+ pairs)
Importance to other bird groups	
Current and potential Threats	Oil spills
Protected status or area designation	Currently no protection
Conservation action needed	
References	
Key contacts (e-mail)	<Jean-Francois.Rail@ec.gc.ca> <Gilles.Chapdelaine@ec.gc.ca>

Name of focus area (with coordinates)	South Gaspé Peninsula
State(s), Province(s)	Quebec
Site description	Coastline, Cliffs, Islands, Sand bars
Importance to this bird group	Black Guillemot, Common Tern, Razorbill, Great Cormorant, Black-legged Kittiwake, Northern Gannet, Yellow Rail, Black-crowned Night Heron (37,000 pairs of gannets at Bonaventure Island)
Importance to other bird groups	
Current and potential Threats	- oil spills - disturbance - interactions with fisheries - bycatch - predation (gulls, foxes)
Protected status or area designation	- Bonaventure Island is a Provincial Park and MBS - Forillon National Park - St. Omer is a MBS
Conservation action needed	
References	
Key contacts (e-mail)	<Jean-Francois.Rail@ec.gc.ca> <Gilles.Chapdelaine@ec.gc.ca>

Name of focus area (with coordinates)	Magdalen Islands
State(s), Province(s)	Quebec
Site description	
Importance to this bird group	Northern Gannet, Razorbill, Black-legged Kittiwake, Black Guillemot, Great Cormorant, Common Tern, Pied-billed Grebe, Horned Grebe, Leach's Storm-Petrel
Importance to other bird groups	
Current and potential Threats	- oil spills - disturbance - fox predation
Protected status or area designation	Pointe de l'Est – NWA Bird Rocks – MBS Brion Island – Provincial Ecological Reserve
Conservation action needed	Outreach
References	
Key contacts (e-mail)	<Jean-Francois.Rail@ec.gc.ca> <Gilles.Chapdelaine@ec.gc.ca>

Name of focus area (with coordinates)	Northeast Coastal New Brunswick
State(s), Province(s)	New Brunswick
Site description	Coastal islands from Kouchibouguac north to Acadian Peninsula (Miscou Island)
Importance to this bird group	Common Tern, Black-crowned Night Heron
Importance to other bird groups	Shorebirds (Piping Plover, migrating shorebirds), migratory waterfowl
Current and potential Threats	- erosion - human disturbance - tourism
Protected status or area designation	RAMSAR site (Tabusintac Lagoon & River Estuary) National Park (Kouchibouguac)
Conservation action needed	Protection/management of common tern colony sites
References	
Key contacts (e-mail)	Atlantic Canada Tern Working Group <Andrew.Boyne@ec.gc.ca>

Name of focus area (with coordinates)	Western Prince Edward Island
State(s), Province(s)	Prince Edward Island
Site description	Western coast of Prince Edward Island
Importance to this bird group	Great Cormorant Common Tern
Importance to other bird groups	
Current and potential Threats	Human disturbance
Protected status or area designation	
Conservation action needed	Protections of largest common tern colony in province at Poverty Beach
References	
Key contacts (e-mail)	Randy Dibblee – PEI

Name of focus area (with coordinates)	Coastal Cape Breton
State(s), Province(s)	Nova Scotia
Site description	Coastal regions of Cape Breton
Importance to this bird group	Great Cormorant (various colonies) Atlantic Puffin Razorbill Black-legged Kittiwake
Importance to other bird groups	wintering waterfowl ?
Current and potential Threats	
Protected status or area designation	Bird Islands WMA Margaree Island NWA
Conservation action needed	Monitoring great cormorant colonies
References	
Key contacts (e-mail)	Randy Milton <miltongr@gov.ns.ca>

Name of focus area (with coordinates)	Tantramar
State(s), Province(s)	New Brunswick, Nova Scotia
Site description	Coastal NB/NS border region including dykelands
Importance to this bird group	Yellow Rail Black Tern Pied-billed Grebe Virginia Rail Sora
Importance to other bird groups	Waterfowl Shorebirds Landbirds
Current and potential Threats	- Agricultural practices - Wetland loss
Protected status or area designation	Tantramar Amherst Point John Lusby Marsh (NWA) Provincially significant wetlands (policy)
Conservation action needed	Outreach to agriculture and public outreach
References	
Key contacts (e-mail)	<Kevin.Connor@gnb.ca>

Name of focus area (with coordinates)	Eastern Shore Nova Scotia
State(s), Province(s)	Nova Scotia
Site description	Eastern 1/3 of coastal Nova Scotia, including numerous offshore islands on south side
Importance to this bird group	Great Cormorant Leach's Storm-Petrel Roseate Tern
Importance to other bird groups	Wintering waterfowl, harlequin ducks
Current and potential Threats	
Protected status or area designation	Eastern Shore WMA (provincial)
Conservation action needed	- monitoring needs for Leach's storm-petrel - continued work at Country Island is important - roseate tern breeding colony
References	
Key contacts (e-mail)	<Andrew.Boyne@ec.gc.ca>

Name of focus area (with coordinates)	St. Margaret's/Mahone Bay
State(s), Province(s)	Nova Scotia
Site description	Coastal bays and associated islands southwest of Halifax
Importance to this bird group	Arctic Tern, Roseate Tern, Common Tern, Atlantic Puffin, Razorbill
Importance to other bird groups	Wintering waterfowl (harlequin duck/seaducks)
Current and potential Threats	Island development for human residential and recreational activities - tourism
Protected status or area designation	Pearl/Grassy Islands WMAs
Conservation action needed	- Island protection/acquisition - stewardship (conservation action) - restoration
References	
Key contacts (e-mail)	Sherman Boates – Nova Scotia DNR

Name of focus area (with coordinates)	Southwestern Nova Scotia
State(s), Province(s)	Nova Scotia
Site description	Coastal Nova Scotia from Wedgeport to Barrington, including islands
Importance to this bird group	Common Tern Roseate Tern Black Guillemot Leach's Storm-Petrel Atlantic Puffin
Importance to other bird groups	Shorebirds Waterfowl
Current and potential Threats	Colony disturbance
Protected status or area designation	"Brothers" have almost been designated as provincial WMA
Conservation action needed	Securement
References	
Key contacts (e-mail)	<Kevin.Connor@gnb.ca>

Name of focus area (with coordinates)	Lower St. John River Floodplain
State(s), Province(s)	New Brunswick
Site description	Wetland complex under tidal influence below Mactaquac (?) Dam to estuary in St. John
Importance to this bird group	Pied-billed Grebe Yellow Rail Virginia Rail Sora Black Tern
Importance to other bird groups	waterfowl, landbirds, shorebirds
Current and potential Threats	- agriculture - development / land use practices (planning) - wetland filling
Protected status or area designation	- provincially significant wetlands (policy) - water course alteration regulation - environmental assessment regulation - securement / managed wetlands (EHJV)
Conservation action needed	- public outreach policy - wetland management - regulation enforcement - best land use practices
References	
Key contacts (e-mail)	<Kevin.Connor@gnb.ca>

Name of focus area (with coordinates)	Gulf of Maine / Bay of Fundy
State(s), Province(s)	New Brunswick, Nova Scotia, Maine
Site description	Coastal region: western boundary = western Casco Bay; eastern boundary = west of St. John's River; including Matinicus group/Grand Manan Archipelago
Importance to this bird group	Breeding: Arctic Tern, Common Tern, Roseate Tern, Razorbill, Atlantic Puffin, Black Guillemot, Great Cormorant, Black-legged Kittiwake, Black-crowned Night Heron, Leach's Storm-Petrel Wintering: Common Loon, Red-throated Loon, Horned Grebe, Red-necked Grebe, Black Guillemot, Razorbill, Atlantic Puffin, Great Cormorant, (Greater Shearwater – pelagic)
Importance to other bird groups	shorebirds (migration and wintering) and waterfowl (breeding and wintering)
Current and potential Threats	- coastal development, fishery by-catch - oil spills, contaminants, commercial fisheries - high concentration and low number of breeding sites - predation
Protected status or area designation	- some islands under Federal, state, or provincial protection - ME & NB oil spill plan/response plan (Natural Resource Protection Act – ME) - Coastal Areas Protection Policies – NB
Conservation action needed	- restoration/establishment of additional colonies (increase number and distribution) - acquire additional islands (permanent protection) - public outreach – recreation use of islands
References	
Key contacts (e-mail)	Scott Hall <shall@audubon.org> Linda Welch <linda_welch@fws.gov> Andrew Boyne <andrew.boyne@ec.gc.ca>

Name of focus area (with coordinates)	Nulhegan / Ranglely Complex
State(s), Province(s)	Vermont, Maine
Site description	Northeast Kingdom, VT and Ranglely/Flagstaff, ME
Importance to this bird group	Common Loon, American Bittern, Pied-billed Grebe
Importance to other bird groups	Waterfowl (American Black Duck) Grassland Birds Boreal Species (Black-backed Woodpecker, Boreal Chickadee)
Current and potential Threats	Common Loon – human disturbance, low productivity
Protected status or area designation	Nulhegan Division – Conte NWR VT, NH, & ME state lands
Conservation action needed	- Wetland protections - Determine causes for COLO declines in ME
References	
Key contacts (e-mail)	Mark LaBarr <mlabarr@audubon.org> Dave Evers <david.evers@briloon.org>

Name of focus area (with coordinates)	Sable Island
State(s), Province(s)	Nova Scotia
Site description	Island / offshore sand spit
Importance to this bird group	Common Tern Arctic Tern Roseate Tern
Importance to other bird groups	Ipswich Sparrow
Current and potential Threats	Oil and gas development
Protected status or area designation	Migratory Bird Sanctuary IBA
Conservation action needed	Ongoing work through Sable Island Preservation Trust
References	Sable Island Conservation Plan – Environment Canada
Key contacts (e-mail)	<Andrew.Boyne@ec.gc.ca>

Name of focus area (with coordinates)	Central Maine Black Tern/Common Loon Areas
State(s), Province(s)	ME
Site description	lacustrine/palustrine emergent wetlands, lacustrine open water
Importance to this bird group	Black Tern Common Loon – core breeding area in ME (~200 pairs), high productivity loon breeding area
Importance to other bird groups	breeding habitat for rails, coots, moorhen, PBGR, waterfowl
Current and potential Threats	- human disturbance - predation, water levels - small, geographically-isolated population - shoreland development - contaminants
Protected status or area designation	shoreland zoning, WMAs, FWS ownership, state ownership (Great Ponds Act)
Conservation action needed	public outreach
References	
Key contacts (e-mail)	Charlie Todd <charlie.todd@state.me.us> Tom Hodgman <tom.hodgman@state.me.us> Dave Evers <david.evers@briloon.org>

Name of focus area (with coordinates)	Winnipiesaukee
State(s), Province(s)	New Hampshire
Site description	Area surrounding Lake Winnipiesaukee including Squam Lake and surrounding watershed
Importance to this bird group	Common Loon American Bittern (?)
Importance to other bird groups	Waterfowl
Current and potential Threats	Development
Protected status or area designation	
Conservation action needed	Common Loon monitoring and protection
References	
Key contacts (e-mail)	

Name of focus area (with coordinates)	Southwest Interior Nova Scotia
State(s), Province(s)	Nova Scotia
Site description	Lakes in interior of southwestern Nova Scotia
Importance to this bird group	Common Loon some small sites for Common Tern
Importance to other bird groups	landbirds, breeding waterfowl
Current and potential Threats	acidification, mercury deposition, disturbance
Protected status or area designation	Kejimikujik Nation Park Tobeatic Wilderness Area
Conservation action needed	
References	
Key contacts (e-mail)	Joe Kerekes (?) – CWS, Dartmouth, NS

Name of focus area (with coordinates)	Maine / New Brunswick Southern Border Region
State(s), Province(s)	Maine, New Brunswick
Site description	southwestern NB and southeastern ME lakes along St. Croix watershed
Importance to this bird group	Common Loon Black Tern
Importance to other bird groups	waterfowl, landbirds, some shorebirds
Current and potential Threats	- contaminants - recreational disturbance (expanding)
Protected status or area designation	- potential protected natural area status in NB - public outreach - shoreline zoning
Conservation action needed	continue public outreach
References	
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us> Kevin Connor <kevin.connor@gnb.ca>

Name of focus area (with coordinates)	Adirondack Park
State(s), Province(s)	New York
Site description	Adirondack Park – six million acres of public and private land within the “Blue Line” as delineated by Environmental Conservation Law. Forest Preserve lands managed by NY DEC. Adirondack Park Agency responsible for park policy. Includes 2,759 lakes and ponds greater than 0.5 acres (246,270 acres)
Importance to this bird group	Common Loon American Bittern Pied-billed Grebe Sora Herring Gull Virginia Rail Common Moorhen
Importance to other bird groups	breeding waterfowl, breeding landbirds (including boreal forest species)
Current and potential Threats	Human disturbance Shoreline development Acid rain Contaminants (e.g., mercury deposition)
Protected status or area designation	Adirondack Park (Blue Line) Forest preserves within park boundary (Forever Wildlife) Wildlife Management Areas (NY DEC) State Parks (OPRHP)
Conservation action needed	Wetland protection, shoreline protection, bird population monitoring, water quality monitoring, contamination load assessment, education/outreach
References	Karl Parker. 1986. DFWMR report Nina Schoch. 2003. WCS report
Key contacts (e-mail)	David Adams <djadams@gw.dec.state.ny.us>

Landbird Focus Areas

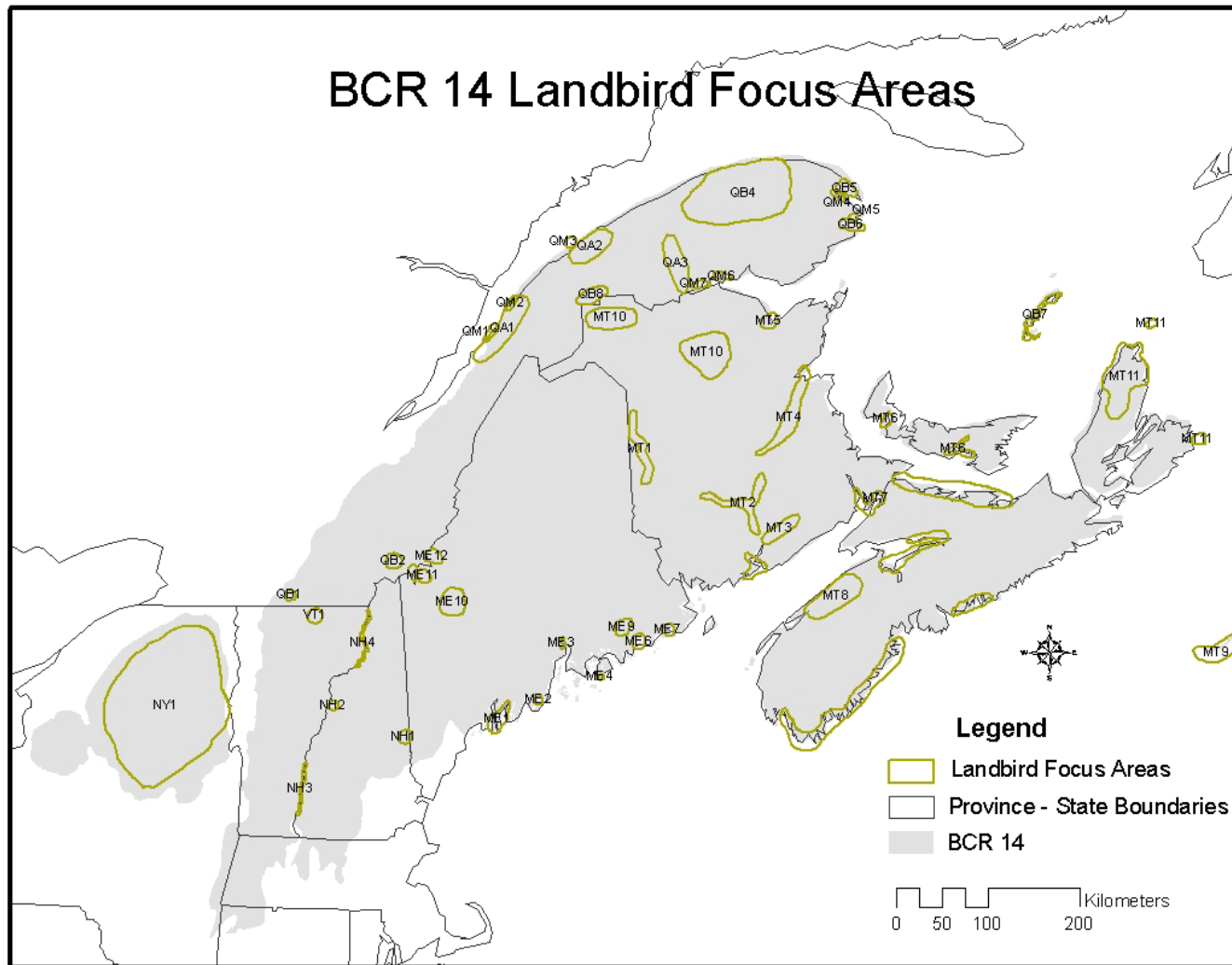


Fig. 10. Map of landbird focus areas (outlined in light green) in BCR 14. See the following page for a list of focus areas by sub-regions and links to more detailed maps and data sheets for these focus areas. Note that these focus areas are primarily for saltmarsh and grassland habitats, as well as some high elevation forest in Canada and Maine. Also see the [Bicknell's Thrush habitat map](#) and the outputs from the bird-habitat modeling exercises for addition important landbird areas.

Landbird Focus Areas are presented in the following pages by groupings of provinces/states, with more detailed maps of each sub-region, followed by data sheets for the corresponding Focus Areas.

- Landbird focus areas in New York, Vermont, New Hampshire, Maine, and southern Quebec ([click for map](#)) include: Adirondack Park ([NY1](#)), Southern Lake Memphremagog ([VT1](#)), Ossipee Pine Barrens/Saco River Grassland Complex ([NH1](#)), Haverhill ([NH2](#)), Lower Connecticut River Valley ([NH3](#)), Upper Connecticut River Valley ([NH4](#)), Lower Kennebec River Marshes ([ME1](#)), Upper Sheepscot Marshes ([ME1](#)), Weskeag River Saltmarsh ([ME2](#)), Mendall Marsh ([ME3](#)), Bass Harbor Marsh ([ME4](#)), Downeast Saltmarsh Complex ([ME5](#)), Roque Bluffs ([ME6](#)), Downeast Blueberry Barrens ([ME7](#)), Saddleback-Sugarloaf Mtns. ([ME8](#)), Snow Mtn. ([ME9](#)), Kibby Mtn. ([ME10](#)), Mont Sutton ([QB1](#)), Mont Mégantic ([QB2](#)), and Monts Gosford and Marbre ([QB3](#)).
- Landbird focus areas in the Gaspé Peninsula and northern New Brunswick ([click for map](#)) include: Center of Gaspé peninsula ([QB4](#)), Forillon National Park ([QB5](#)), Percé vicinity and Île Bonaventure ([QB6](#)), New Brunswick-Québec border ([QB8](#)), St.-Pascal to St.-André ([QM1](#)), Cacouna to IsleVerte ([QM2](#)), Rimouski to Pointe-au-Père ([QM3](#)), Gaspé ([QM4](#)), Barachois de Malbaie ([QM5](#)), Rivière Nouvelle estuary ([QM6](#)), Pointe à la Croix ([QM7](#)), La Pocatière to Île Verte ([QA1](#)), Rimouski to Ste. Flavie ([QA2](#)), Valley of Matapédia ([QA3](#)), Upper Saint John River ([MT1](#)), Miramichi River ([MT4](#)), Bathurst ([MT5](#)), and North-central New Brunswick ([MT10](#)).
- Landbird focus areas in southern New Brunswick, Prince Edward Island, and Nova Scotia ([click for map](#)) include: Mid-Saint John River/Grand Lake ([MT2](#)), Sussex ([MT3](#)), Prince Edward Island ([MT6](#)), New Brunswick-Nova Scotia Border Region ([MT7](#)), Annapolis Valley ([MT8](#)), Sable Island ([MT9](#)), Northern Cape Breton Island/Scaterie Island/St. Paul Island ([MT11](#)), and Îles de la Madeline ([QB7](#)).

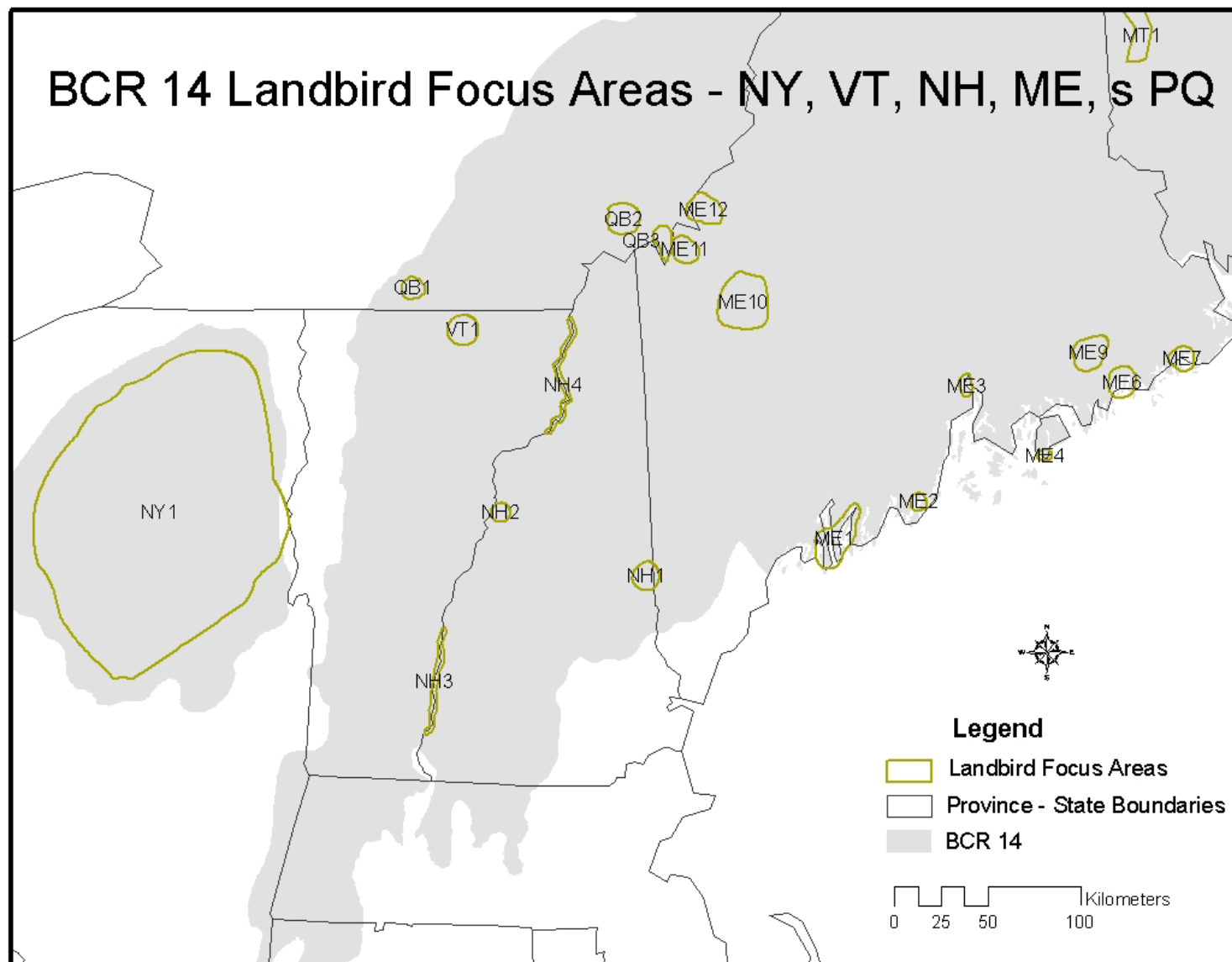


Fig. 11. Map of Landbird Focus Areas in New York, Vermont, New Hampshire, Maine, and southern Quebec: [NY1](#), [VT1](#), [NH1](#), [NH2](#), [NH3](#), [NH4](#), [ME1-lower](#), [ME1-upper](#), [ME2](#), [ME3](#), [ME4](#), [ME5](#), [ME6](#), [ME7](#), [ME8](#), [ME9](#), [ME10](#), [QB1](#), [QB2](#), [QB3](#).

Name of focus area (with coordinates)	Adirondack Park (Map reference – NY 1)
State(s), Province(s)	New York
Site description	Adirondack Park – six million acres of public and private land within the “Blue Line” as delineated by Environmental Conservation Law. Forest Preserve lands managed by NY DEC. Adirondack Park Agency responsible for park policy. Includes 2,759 lakes and ponds greater than 0.5 acres (246,270 acres)
Importance to this bird group	High priority area for birds breeding in northern hardwood, conifer, and mountane forests Priority species include Bicknell’s Thrush, Canada Warbler, Bay-breasted Warbler, Wood Thrush, Black-throated Blue Warbler, American Woodcock, Chestnut-sided Warbler, Olive-sided Flycatcher, Purple Finch, Eastern Wood-Pewee, Veery, Yellow-bellied Flycatcher
Importance to other bird groups	breeding waterbirds and waterfowl
Current and potential Threats	Human disturbance Shoreline development Acid rain Contaminants (e.g., mercury deposition)
Protected status or area designation	Adirondack Park (Blue Line) Forest preserves within park boundary (Forever Wildlife) Wildlife Management Areas (NY DEC) State Parks (OPRHP)
Conservation action needed	Wetland protection, shoreline protection, bird population monitoring, water quality monitoring, contamination load assessment, education/outreach
References	Karl Parker. 1986. DFWMR report Nina Schoch. 2003. WCS report
Key contacts (e-mail)	Tim Post <tjpost@gw.dec.state.ny.us> Mitch Hartley <Mitch_Hartley@fws.gov>

Name of focus area (with coordinates)	Southern Lake Memphremagog (Map Reference – VT 1)
State(s), Province(s)	Vermont
Site description	Agricultural lands including mowed fields, pastures, plus Coventry Airport
Importance to this bird group	Relatively extensive grassland habitat for breeding Bobolink and other grassland birds; Northern Harriers also use area
Importance to other bird groups	Have had one pair of Upland Sandpipers at Coventry Airport; Overlaps with wetland IBA with Black Tern, Common Moorhen, and American Bittern
Current and potential Threats	- changing agricultural practices are including more row crops (corn) - timing and frequency of mowing - airport expansion - landfill
Protected status or area designation	Designated as an Audubon Vermont IBA, plus some state owned land
Conservation action needed	- Conservation Reserve Program needs to be expanded in this area - Airport management - A state recovery plan is in draft form
References	
Key contacts (e-mail)	Steve Parren <sparren@fwd.gnr.state.vt.us>

Name of focus area (with coordinates)	Ossipee Pine Barrens/Saco River Grassland Complex (Map Reference – NH 1)
State(s), Province(s)	New Hampshire, Maine
Site description	Extensive sandplain (2,000+ acres); pitch pine scrub oak barrens; floodplain system along Saco River is associated and has farms and grasslands
Importance to this bird group	Breeding habitat for a wide variety of priority species: American Woodcock, Canada Warbler, Prairie Warbler, Olive-sided Flycatcher, Chestnut-sided Warbler, Veery, Yellow-bellied Sapsucker, Ruffed Grouse, Purple Finch, Bobolink, Northern Parula, Blackburnian Warbler, Whip-poor-will, Chimney Swift, Vesper Sparrow, Common Nighthawk, Purple Martin
Importance to other bird groups	Imbedded lakes support Common Loon
Current and potential Threats	Highly developable, extremely large gravel extraction, fire suppression
Protected status or area designation	1200 acres protected by TNC but little to no funds available for enhancement/restoration of this fire dependent system
Conservation action needed	Enhancement, acquisition, restoration
References	Patterson (UMass), TNC, UVM
Key contacts (e-mail)	

Name of focus area (with coordinates)	Haverhill (Map Reference – NH 2)
State(s), Province(s)	New Hampshire
Site description	Mixed agricultural lands along Connecticut River valley
Importance to this bird group	Breeding habitat for common grassland species: Bobolink, Eastern Meadowlark, Savannah Sparrow, occasionally used by Vesper Sparrow and Grasshopper Sparrow; migration habitat for Northern Harrier
Importance to other bird groups	Habitat for Upland Sandpiper
Current and potential Threats	Farm abandonment, conversion from hay/pasture to cropland
Protected status or area designation	Within Conte NFWR boundary
Conservation action needed	Maintain existing grassland acreages
References	Massachusetts Audubon grassland bird survey data
Key contacts (e-mail)	Pam Hunt <phunt@nhaudubon.org>

Name of focus area (with coordinates)	Lower Connecticut River Valley (Map Reference – NH 3)
State(s), Province(s)	New Hampshire, Vermont
Site description	Mixed agricultural lands along lower Connecticut River valley, roughly between Putney and Windsor, Vermont
Importance to this bird group	Breeding habitat for common grassland species: Bobolink, Eastern Meadowlark, Savannah Sparrow, occasionally used by Vesper Sparrow and Grasshopper Sparrow; migration habitat for Northern Harrier
Importance to other bird groups	Habitat for Upland Sandpiper
Current and potential Threats	Farm abandonment, conversion from hay/pasture to cropland
Protected status or area designation	Within Conte NFWR boundary
Conservation action needed	Maintain existing grassland acreages
References	Massachusetts Audubon grassland bird survey data
Key contacts (e-mail)	Pam Hunt <phunt@nhaudubon.org>

Name of focus area (with coordinates)	Upper Connecticut River Valley (Map Reference – NH 4)
State(s), Province(s)	Vermont, New Hampshire
Site description	1/2 mile adjacent to VT&NH banks of Connecticut River from the junction of Johns River (Dalton, NH) to Canaan, VT. Grassland, pasture, corn adjacent to riparian wetlands – mostly privately owned.
Importance to this bird group	Breeding habitat for grasslands birds, including sparrows, meadowlarks, and Northern Harrier
Importance to other bird groups	Breeding and migrating habitat for waterfowl, including Black Duck and Wood Duck
Current and potential Threats	- development - farming practices (early/frequent mowing) - grazing practices
Protected status or area designation	- majority unprotected - NH wildlife management area - NAWCA grant (2001)
Conservation action needed	- protect from conversion to other uses - develop incentives to change some agricultural practices (early/frequent mowing)
References	
Key contacts (e-mail)	Scot Williamson <wmisw@together.net>, Will Staats (NH Fish & Game), William Crenshaw (VT Fish & Wildlife)

Name of focus area (with coordinates)	Lower Kennebec River Marshes (Map Reference – <i>lower part of ME 1</i>)
State(s), Province(s)	Maine
Site description	Includes five tidal marshes (along Sprague, Morse, and Little Rivers, Atkins Bay and behind Outer Head) with emergent vegetation (<i>Spartina</i> - dominated) near the mouth of the Kennebec River.
Importance to this bird group	All 5 sites occupied by both Nelson's and Saltmarsh Sharp-tailed Sparrows
Importance to other bird groups	Other species using this area include Willet, Yellowlegs, Least Sandpiper, and wintering Black Duck. Foraging areas for Least Tern – adjacent beaches are breeding sites for LETS and PIPL
Current and potential Threats	- Ditch plugging may not benefit sparrows. - Human use of parks not perceived to be a problem at present - Preliminary data on sparrows indicate contaminants (e.g., Hg) could be significant - Defense contractor/ship builder just upstream on Kennebec River. - Residential and summer home development.
Protected status or area designation	- Outer Head and portions of Atkins Bay, Little and Morse Rivers are State-owned (Popham Beach and Reid State Parks). - All or most of Sprague River owned by TNC.
Conservation action needed	- Population monitoring of sparrows and other saltmarsh birds - Evaluate "restoration" effects on sparrows - Investigate Hg and other contaminants in marsh wildlife especially high-trophic-level birds - Conservation buffer needed at all sites.
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. 1998. Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Upper Sheepscot Marshes (Map Reference – <i>upper part of</i> ME 1)
State(s), Province(s)	Maine
Site description	Two saltmarshes in upper Sheepscot River watershed: Dyer River and Deer Meadow Brook in town of Newcastle
Importance to this bird group	Occupied by both Nelson's and Saltmarsh Sharp-tailed Sparrow. In 1998, abundance of Nelson's was higher than any other marsh surveyed along the midcoast region of Maine. Interestingly, Bobolink present at Dyer River in 1998.
Importance to other bird groups	Used by 20 or more different species including Black Duck, Mallards, Great Blue Heron, Lesser Yellowlegs, Least Sandpiper.
Current and potential Threats	- Development of surrounding lands because of lack conservation buffer.
Protected status or area designation	Privately owned though state property adjacent to Deer Meadow Brook.
Conservation action needed	- Further inventory work to better define significance of area for breeding and nonbreeding birds. - Basic land conservation activities needed starting at the land trust and municipal level by identifying and acquiring anchor parcels.
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. 1998. Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Weskeag River Saltmarsh (Map Reference – ME 2)
State(s), Province(s)	South Thomaston, Maine
Site description	Tidal marsh associated with upper Weskeag River. Extremely detailed panne complex. Historically heavily ditched presumably for harvest of salt hay.
Importance to this bird group	Northernmost breeding location for Saltmarsh Sharp-tailed Sparrow. Nelson's Sharp-tailed Sparrow also breeds here in good numbers
Importance to other bird groups	Very important shorebird stopover site; wintering waterfowl in abundance, especially Black Duck. Also, many rarities have been observed including Garganey, European Wigeon, Ruff
Current and potential Threats	<i>Ditch-plugging efforts have been extensive and may effect sparrow nesting habitat.</i> Concrete manufacturing facility nearby – potential contaminants
Protected status or area designation	Flowage itself and some adjacent upland is state-owned Wildlife Management Area (R. Waldo Tyler W.M.A.). State –owned uplands are actively farmed (comm. Vegetable prod.) though activities monitored by state staff.
Conservation action needed	- Population monitoring of sparrows and other saltmarsh birds especially in light of ditch plugging activities - Investigate Hg and other contaminants in marsh wildlife especially high-trophic-level birds - Remove tidal restriction at Buttermilk Lane to open up additional sparrow habitat.
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. 1998 Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Mendall Marsh (Map Reference – ME 3)
State(s), Province(s)	Frankfort-Prospect, Maine
Site description	Brackish marsh where Marsh Stream enters Penobscot River. Site surrounded by coastal mountains with granite quarries.
Importance to this bird group	Occupied by Nelson's Sharp-tailed Sparrow
Importance to other bird groups	Also used by Black Duck especially in winter.
Current and potential Threats	- Potential Hg and Dioxin contamination from adjacent Penobscot River - Surrounding hillsides likely to be developed for residences
Protected status or area designation	State-owned Wildlife Management Area (Howard Mendall W.M.A.)– Small upland area also in conservation ownership. Otherwise no conservation buffer exists, i.e., only “flowage rights” in conservation ownership.
Conservation action needed	- Population monitoring of sparrows and other saltmarsh birds - Investigate Hg and other contaminants in marsh wildlife especially high-trophic-level birds
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. 1998. Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Bass Harbor Marsh (Map Reference – ME 4)
State(s), Province(s)	Maine
Site description	Small saltmarsh located on Mt Desert Island. Although small, this is one of the first marshes to the east of Penobscot Bay, an area with little <i>Spartina</i> habitat.
Importance to this bird group	Nelson’s Sharp-tailed Sparrow breeds there annually and Sedge Wren has been reported breeding there in 1971 as well as possibly “prospecting” there in 1999.
Importance to other bird groups	Breeding record for Least Bittern at site in 2001. An important site for wintering black Ducks.
Current and potential Threats	Few, although adjacent land owners/users may not recognize the conservation importance of this site on the island.
Protected status or area designation	Most of the marsh itself and surrounding uplands are part of Acadia National Park
Conservation action needed	- Further inventories of birds using site especially during spring and fall migration - Complete acquisition or easement of a surrounding buffer.
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. Ecoregional Survey Report. MDIFW Witt, C. W. 1997. The birds of Mt. Desert Island and Acadia National Park
Key contacts (e-mail)	Tom Hodgman tom.hodgman@state.me.us Bruce Connery bruce_connery@nps.gov

Name of focus area (with coordinates)	Downeast Saltmarsh Complex (Map Reference – ME 5)
State(s), Province(s)	Maine
Site description	Several saltmarshes associated with rivers in Washington County, Maine including marshes along the Pleasant, Mill, Harrington, and Narraguagus Rivers and Curtis Creek. Individually these sites (except Pleasant) may not warrant consideration but because of their close proximity to one another justify a larger focus area.
Importance to this bird group	Nelson's sharp-tailed Sparrow breeds in all 5 marshes here. Little inventory work has been done, especially outside the breeding season.
Importance to other bird groups	The area in general, and some of the marshes in particular, are important shorebird habitat. Important for wintering Black Ducks and several Bald Eagle nests occur in area. Breeding season surveys indicated that Pleasant River has highest avian diversity (29 species) of 30 sites visited in eastern Maine.
Current and potential Threats	Surrounding land use may not be consistent with conservation of sites. Neighboring uplands vulnerable to coastal development.
Protected status or area designation	Little conservation ownership in area overall although awareness of importance of area has been heightened among land trusts. Maine DIFW owns at least one small parcel in the area.
Conservation action needed	- Further inventory work to better define significance of area breeding and nonbreeding birds. - Basic land conservation activities needed starting at the land trust and municipal level by identifying and acquiring anchor parcels.
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. 2001. Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Roque Bluffs (Map Reference - ME 6)
State(s), Province(s)	Maine
Site description	Saltmarsh along the Englishman River and adjacent bay in the town of Roque Bluffs.
Importance to this bird group	Occupied by Nelson's Sharp-tailed Sparrow.
Importance to other bird groups	High avian diversity relative to other marshes in region (22 species) including 6 species of shorebirds. Barrow's Goldeneye present in bay near mouth of River.
Current and potential Threats	Vulnerable to development of surrounding lands – lacks adequate conservation buffer
Protected status or area designation	Small portion owned by Maine DIFW. Nearby beach is Roque Bluffs State Park.
Conservation action needed	- Further inventory work to better define significance of area breeding and nonbreeding birds. - Basic land conservation activities needed starting at the land trust and municipal level by identifying and acquiring anchor parcels.
References	Hodgman et al. 2002. Wilson Bulletin 114(1)38-43. Hodgman et al. 2001. Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Downeast Blueberry Barrens (Map Reference – ME 7)
State(s), Province(s)	Maine
Site description	Commercially-managed blueberry barrens largely, but not exclusively in the towns of Beddington, Deblois, Columbia, T18, T19, T24, and T25 MD BPP.
Importance to this bird group	Nesting habitat for Upland Sandpiper, Northern Harrier, Vesper and Savannah Sparrow; potential breeding habitat for Short-eared Owl.
Importance to other bird groups	Proximity to coast provides foraging habitat for Whimbrels. Small flowages and ponds are breeding habitat for Black Ducks and Ring-necked Duck.
Current and potential Threats	- potential impact from pesticide/herbicide use - intensive agriculture results in lack of herbaceous cover leading to a decline of nesting cover and perhaps increased predation
Protected status or area designation	Largely privately owned although small parcel(s) State-owned
Conservation action needed	Studies on impacts of pesticides/herbicides, impacts of prescribed burning at appropriate times (non-nesting season), and ways of providing areas with herbaceous cover within the barrens
References	Peter Vickery (multiple manuscripts), Jeff Wells (manuscript & dissertation), Weik and Purtell. 2001. Ecoregional Survey Report. MDIFW
Key contacts (e-mail)	Peter Vickery <pvickery@rcn.com>, Tom Hodgman <tom.hodgman@state.me.us>, Andy Weik <andy.weik@state.me.us>

Name of focus area (with coordinates)	Saddleback-Sugarloaf Mountains (Map Reference - ME 8)
State(s), Province(s)	Maine
Site description	Mountaintop with coniferous forests for Bicknell's Thrush.
Importance to this bird group	Occupied by Bicknell's Thrush
Importance to other bird groups	
Current and potential Threats	Atmospheric deposition, global climate change, disturbance or further development from ski resorts
Protected status or area designation	None at this time
Conservation action needed	Habitat conservation; determine size of Bicknell's Thrush population using this area
References	
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Snow Mountain (Map Reference - ME 9)
State(s), Province(s)	Maine
Site description	Mountaintop with coniferous forests for Bicknell's Thrush.
Importance to this bird group	Occupied by Bicknell's Thrush
Importance to other bird groups	
Current and potential Threats	Atmospheric deposition, global climate change
Protected status or area designation	None at this time
Conservation action needed	Habitat conservation; determine size of Bicknell's Thrush population using this area
References	
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Kibby Mountain (Map Reference - ME 10)
State(s), Province(s)	Maine
Site description	Mountaintop with coniferous forests for Bicknell's Thrush.
Importance to this bird group	Occupied by Bicknell's Thrush
Importance to other bird groups	
Current and potential Threats	Atmospheric deposition, global climate change
Protected status or area designation	None at this time
Conservation action needed	Habitat conservation; determine size of Bicknell's Thrush population using this area
References	
Key contacts (e-mail)	Tom Hodgman <tom.hodgman@state.me.us>

Name of focus area (with coordinates)	Mont Sutton (Map Reference – QB 1)
State(s), Province(s)	Quebec
Site description	Mountaintops with coniferous forests for Bicknell's Thrush
Importance to this bird group	Moderate importance - small population
Importance to other bird groups	Low – out of the range of most mature conifer forest priority species
Current and potential Threats	Atmospheric deposition, global climate change ; this is a ski area so further development for ski or recreation in summer could be a threat
Protected status or area designation	None
Conservation action needed	Habitat protection
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Mont Mégantic (Map Reference – QB 2)
State(s), Province(s)	Quebec
Site description	Mountaintop with coniferous forests for Bicknell's Thrush
Importance to this bird group	Moderate importance – small population
Importance to other bird groups	High importance – Many mature conifer forest priority species occur in this area
Current and potential Threats	Atmospheric deposition, global climate change
Protected status or area designation	There is a provincial park at the top of the mountain with signs warning not to disturb the thrush and its habitat
Conservation action needed	No important action to be done
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Monts Gosford and Marbre (Map Reference – QB 3)
State(s), Province(s)	Quebec
Site description	Mountaintops and coniferous forest regeneration patches for Bicknell's Thrush
Importance to this bird group	Highest importance – large population
Importance to other bird groups	High importance – Many mature conifer forest priority species occur in this area
Current and potential Threats	Atmospheric deposition, global climate change, possible small recreational disturbance, no immediate threat from forestry because most of the area was cut 30 years ago and trees are still not tall enough
Protected status or area designation	None
Conservation action needed	Habitat protection, agreement with forestry company
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

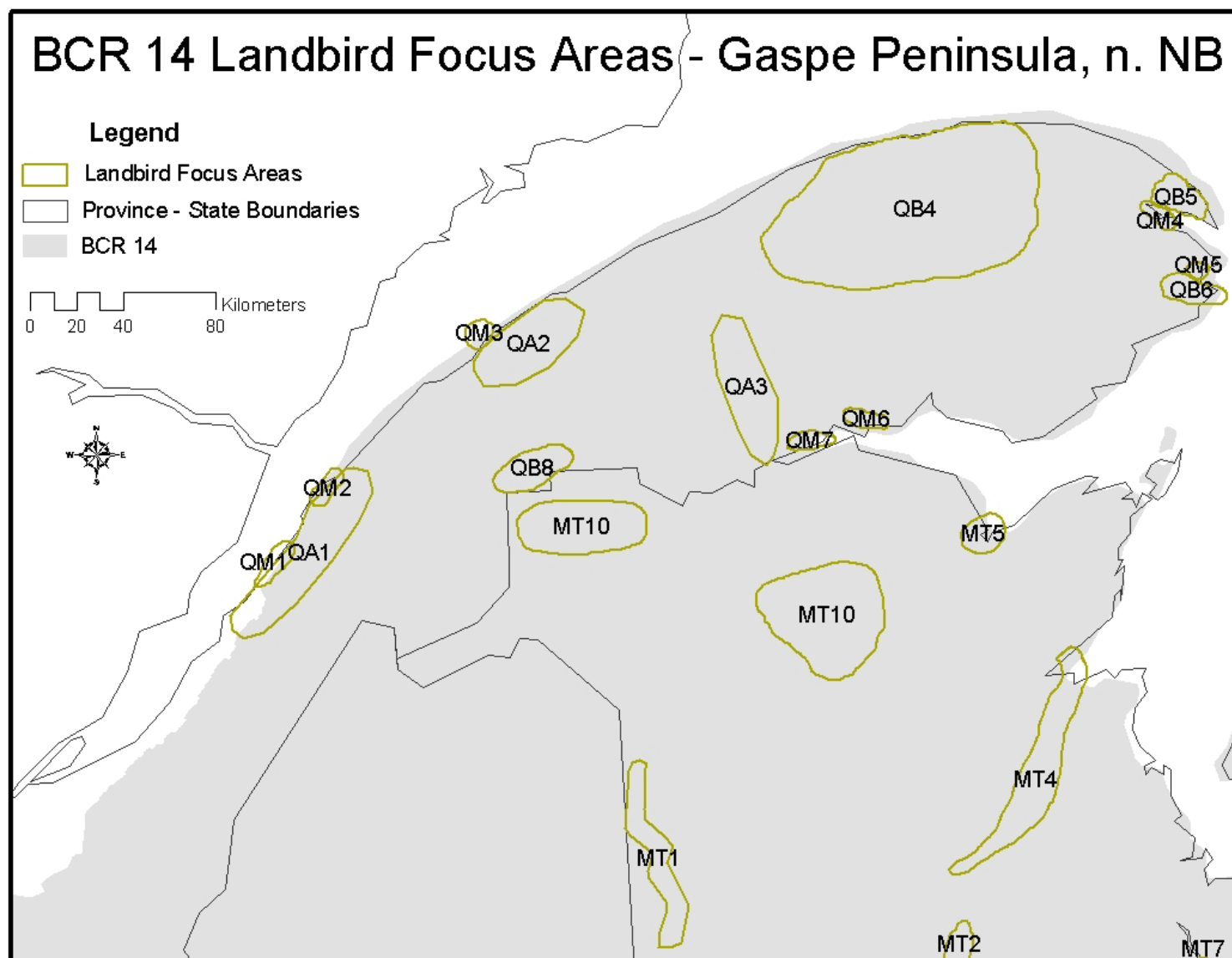


Fig. 12. Map of Landbird Focus Areas in the Gaspé Peninsula of Quebec and northern New Brunswick: [QB4](#), [QB5](#), [QB6](#), [QB8](#), [QM1](#), [QM2](#), [QM3](#), [QM4](#), [QM5](#), [QM6](#), [QM7](#), [QA1](#), [QA2](#), [QA3](#), [MT1](#), [MT4](#), [MT5](#), [MT10](#).

Name of focus area (with coordinates)	Center of Gaspé peninsula (Map Reference – QB 4)
State(s), Province(s)	Quebec
Site description	Bicknell's Thrush habitat including mountain tops and coniferous forest regeneration patches
Importance to this bird group	Highest importance – large population
Importance to other bird groups	Highest importance – areas of abundance of Blackpoll Warbler, Bay-breasted Warbler, Cape May Warbler, Black-backed Woodpecker, and Purple Finch and nearly all the other conifer forest priority species
Current and potential Threats	Most of the area outside the park is being heavily logged, small recreational disturbance in the park
Protected status or area designation	Part of the area is included in a provincial park
Conservation action needed	Habitat protection, agreement with forestry companies
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Forillon National Park (Map Reference – QB 5)
State(s), Province(s)	Quebec
Site description	Mountain tops and coniferous forests close to the St. Lawrence River for Bicknell's Thrush
Importance to this bird group	Moderate importance – small population
Importance to other bird groups	High importance – Many mature conifer forest priority species occur in this area
Current and potential Threats	Atmospheric deposition, global climate change, but no other threats except maybe small recreational disturbance
Protected status or area designation	National park
Conservation action needed	No important action to be done
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Percé vicinity (Mt. Blanc and Mt. Ste. Anne) and Île Bonaventure (Map Reference – QB 6)
State(s), Province(s)	Québec
Site description	Mountain tops and island covered with coniferous forests propitious for Bicknell's Thrush
Importance to this bird group	Moderate importance – small population
Importance to other bird groups	Moderate - Many mature conifer forest priority species occur in this sector but the area is not very large
Current and potential Threats	Atmospheric deposition, global climate change, but no other threats except maybe small recreational disturbance and communication towers on Mt. Blanc
Protected status or area designation	Île Bonaventure is a provincial park
Conservation action needed	Habitat protection on Mt. Blanc and Mt. Ste. Anne
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	New Brunswick-Québec border (Map Reference – QB 8)
State(s), Province(s)	Québec
Site description	Mountaintops with coniferous forests for Bicknell's Thrush ?
Importance to this bird group	Uncertain : the Quebec side still has to be surveyed but there is a population on the New Brunswick side just over the border
Importance to other bird groups	Probably high - Most mature conifer forest priority species probably nest in this area
Current and potential Threats	Uncertain with the exception of general threats like atmospheric deposition and global climate change
Protected status or area designation	None
Conservation action needed	Habitat protection, surveys to clarify the status of this population
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	St.-Pascal to St.-Andre (Map Reference – QM 1)
State(s), Province(s)	Québec
Site description	Salt Marshes (brackish water) for Nelson's Sharp-tailed Sparrow
Importance to this bird group	Moderate importance – not a very large population (needs to be reconfirmed by recent surveys)
Importance to other bird groups	High importance – very important area for Short-eared Owl and Northern Harrier
Current and potential Threats	Degradation and loss of habitat
Protected status or area designation	Some small and scattered protected lots along the shore
Conservation action needed	Protection of the habitat and survey to update population status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Cacouna to IsleVerte (Map Reference – QM 2)
State(s), Province(s)	Québec
Site description	Salt Marshes (brackish water) for Nelson's Sharp-tailed Sparrow
Importance to this bird group	High importance – large population (needs to be reconfirmed by recent surveys)
Importance to other bird groups	High importance – very important area for Short-eared Owl and Northern Harrier
Current and potential Threats	Degradation and loss of habitat
Protected status or area designation	National Wildlife Refuge at Île Verte, Env. Canada also owns some land in the Cacouna area
Conservation action needed	Protection of the habitat and survey to update population status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Rimouski to Pointe-au-Père (Map Reference – QM 3)
State(s), Province(s)	Québec
Site description	Salt Marshes (brackish water) for Nelson's Sharp-tailed Sparrow
Importance to this bird group	Moderate importance – small population (needs to be reconfirmed by recent surveys)
Importance to other bird groups	Low importance – probably supports Northern Harrier
Current and potential Threats	?
Protected status or area designation	There is a National Wildlife Refuge at Pointe-au-Père
Conservation action needed	Protection of the habitat and survey to update population status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Gaspé (Darmouth and York rivers estuaries) (Map Reference – QM 4)
State(s), Province(s)	Québec
Site description	Salt marsh for Nelson's Sharp-tailed Sparrow
Importance to this bird group	Moderate importance – small population (needs to be reconfirmed by recent surveys)
Importance to other bird groups	Low to moderate importance – Short-eared Owls and Northern Harriers but the area is small in size
Current and potential Threats	Degradation and loss of habitat
Protected status or area designation	None
Conservation action needed	Protection of habitat and survey to update status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Barachois de Malbaie (Map Reference – QM 5)
State(s), Province(s)	Québec
Site description	Salt marsh for Nelson's Sharp-tailed Sparrow
Importance to this bird group	Moderate importance – not a very large population (needs to be reconfirmed by recent surveys)
Importance to other bird groups	Low to Moderate importance – possible use by Short-eared Owls and Northern Harriers but small area
Current and potential Threats	Degradation and loss of habitat
Protected status or area designation	None
Conservation action needed	Protection of habitat and survey to update status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Rivière Nouvelle estuary (48 ° 06 ' N 66 ° 16 ' W) (Map Reference – QM 6)
State(s), Province(s)	Québec
Site description	Salt marsh for Nelson's Sharp-tailed Sparrow
Importance to this bird group	Moderate - not a very large population (needs to be reconfirmed by recent surveys)
Importance to other bird groups	Low to moderate importance – possible use by Short-eared Owls and Northern Harriers but small area
Current and potential Threats	Degradation and loss of habitat
Protected status or area designation	None
Conservation action needed	Protection of habitat and survey to update status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Pointe a la Croix (Map Reference – QM 7)
State(s), Province(s)	Québec
Site description	Salt marsh for Nelson's Sharp-tailed Sparrow
Importance to this bird group	Thought to be of highest importance – had a large population in 1985 ; another survey would be needed
Importance to other bird groups	Low to Moderate importance – possible use by Short-eared Owls and Northern Harriers but area is small
Current and potential Threats	Degradation and loss of habitat
Protected status or area designation	A small area has been set aside by a conservation society
Conservation action needed	Protection of habitat and survey to update status
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	La Pocatière to Île Verte (Map Reference – QA 1)
State(s), Province(s)	Quebec
Site description	Relatively traditional agriculture/grasslands and pastures for Short-eared Owl, Northern Harrier, Eastern Meadowlark, Vesper Sparrow, Bobolink, Horned Lark, swallows, Eastern Bluebird, and Upland Sandpiper
Importance to this bird group	Moderate importance – close to the northeast breeding limit of these species, so they are not as abundant as farther south, except for Short-eared Owl, for which this is an important area in Quebec
Importance to other bird groups	Low – too far north for most of the shrub-associated priority species and not in the mature conifer or mature deciduous area
Current and potential Threats	Farmland abandonment and changes in farming practices
Protected status or area designation	None
Conservation action needed	Set aside some grassland for the conservation of these species
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Rimouski to Ste. Flavie (Map Reference – QA 2)
State(s), Province(s)	Quebec
Site description	Relatively traditional agriculture/grasslands and pastures for Short-eared Owl, Northern Harrier, Eastern Meadowlark, Vesper Sparrow, Bobolink, Horned Lark, swallows, Eastern Bluebird, and Upland Sandpiper
Importance to this bird group	Moderate importance – close to the northeast breeding limit of these species, so they are not as abundant as farther south, except for Short-eared Owl, for which this is an important area in Quebec
Importance to other bird groups	Low – too far north for most of the shrub-associated priority species and not in the mature conifer or mature deciduous area
Current and potential Threats	Farmland abandonment and changes in farming practices
Protected status or area designation	None
Conservation action needed	Set aside some grassland for the conservation of these species
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Valley of Matapédia (Map Reference – QA 3)
State(s), Province(s)	Quebec
Site description	Relatively traditional agriculture/grasslands and pastures for Northern Harrier, Vesper Sparrow, Bobolink, and swallows
Importance to this bird group	Moderate to low importance – close to the northeast breeding limit of these species, so they are not as abundant as farther south, some are even rare or absent
Importance to other bird groups	Low – too far north for most of the shrub-associated priority species and not in the mature conifer or mature deciduous area
Current and potential Threats	Farmland abandonment and changes in farming practices
Protected status or area designation	None
Conservation action needed	Set aside some grassland for the conservation of these species
References	
Key contacts (e-mail)	Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Upper Saint John River (Map Reference – MT 1)
State(s), Province(s)	New Brunswick
Site description	Human created grassland complex. Includes the St John river valley area between Perth-Andover and Woodstock. Cropland is the dominate grassland like feature.
Importance to this bird group	This is an area of concentrated breeding habitat.
Importance to other bird groups	Has a relatively high density of breeding Mallards.
Current and potential Threats	No current threats identified. Potential threats include impacts of pesticides and changing farming practices.
Protected status or area designation	None.
Conservation action needed	Monitoring the distribution and status of priority bird species in this area. Monitoring/determining the amounts, distribution and expected changes of grassland habitats in this area
References	None.
Key contacts (e-mail)	None.

Name of focus area (with coordinates)	Miramichi River (Map Reference – MT 4)
State(s), Province(s)	New Brunswick
Site description	Human created grassland complex. Includes the Miramichi river valley area between Boistown and Miramichi Bay. Very linear in distribution.
Importance to this bird group	This is an area of concentrated breeding habitat. Nelson's Sharp-tailed Sparrow breed in this area.
Importance to other bird groups	Of low importance.
Current and potential Threats	Current threats could include succession of fields to forest. Potential threats include impacts of pesticides and changing farming practices.
Protected status or area designation	None.
Conservation action needed	Monitoring the distribution and status of priority bird species in this area. Monitoring/determining the amounts, distribution and expected changes of grassland habitats in this area
References	None.
Key contacts (e-mail)	None.

Name of focus area (with coordinates)	Bathurst (Map Reference – MT 5)
State(s), Province(s)	New Brunswick
Site description	Human created grassland complex. Includes the settled, coastal areas of the north east corner of New Brunswick (the Bathurst area and Acadian Peninsula).
Importance to this bird group	This is an area of concentrated breeding habitat.
Importance to other bird groups	Large numbers of waterfowl stage in Bathurst harbor during migration.
Current and potential Threats	Current threats could include succession of fields to forest. Potential threats include impacts of pesticides and changing farming practices.
Protected status or area designation	All coastal wetlands are designated Provincially Significant Wetlands and no development within 30 meters is permitted.
Conservation action needed	Monitoring the distribution and status of priority bird species in this area. Monitoring/determining the amounts, distribution and expected changes of grassland habitats in this area
References	None.
Key contacts (e-mail)	None.

Name of focus area (with coordinates)	North-central New Brunswick (Map Reference – MT 10)
State(s), Province(s)	New Brunswick
Site description	A varied, high elevation mountainous forest landscape dominated by industrial forestry.
Importance to this bird group	Home of one of the best known Bicknell's Thrush populations. Although part of the area is protected in Mount Carleton Provincial Park most of the BITH range is under constant disturbance from forestry activities.
Importance to other bird groups	None of particular importance.
Current and potential Threats	Forestry activities, particularly pre-commercial thinning, is known to occur during the nesting season in areas occupied by BITH. There appears to be a significant overlap between the time that second growth forest becomes suitable BITH habitat and the time forestry companies do thinning. Other habitat issues also probable.
Protected status or area designation	Mount Carleton Provincial Park protects perhaps 5% of the population in that area.
Conservation action needed	Agreements with forestry companies to protect occupied habitats from thinning.
References	
Key contacts (e-mail)	Dan.Busby@ec.gc.ca

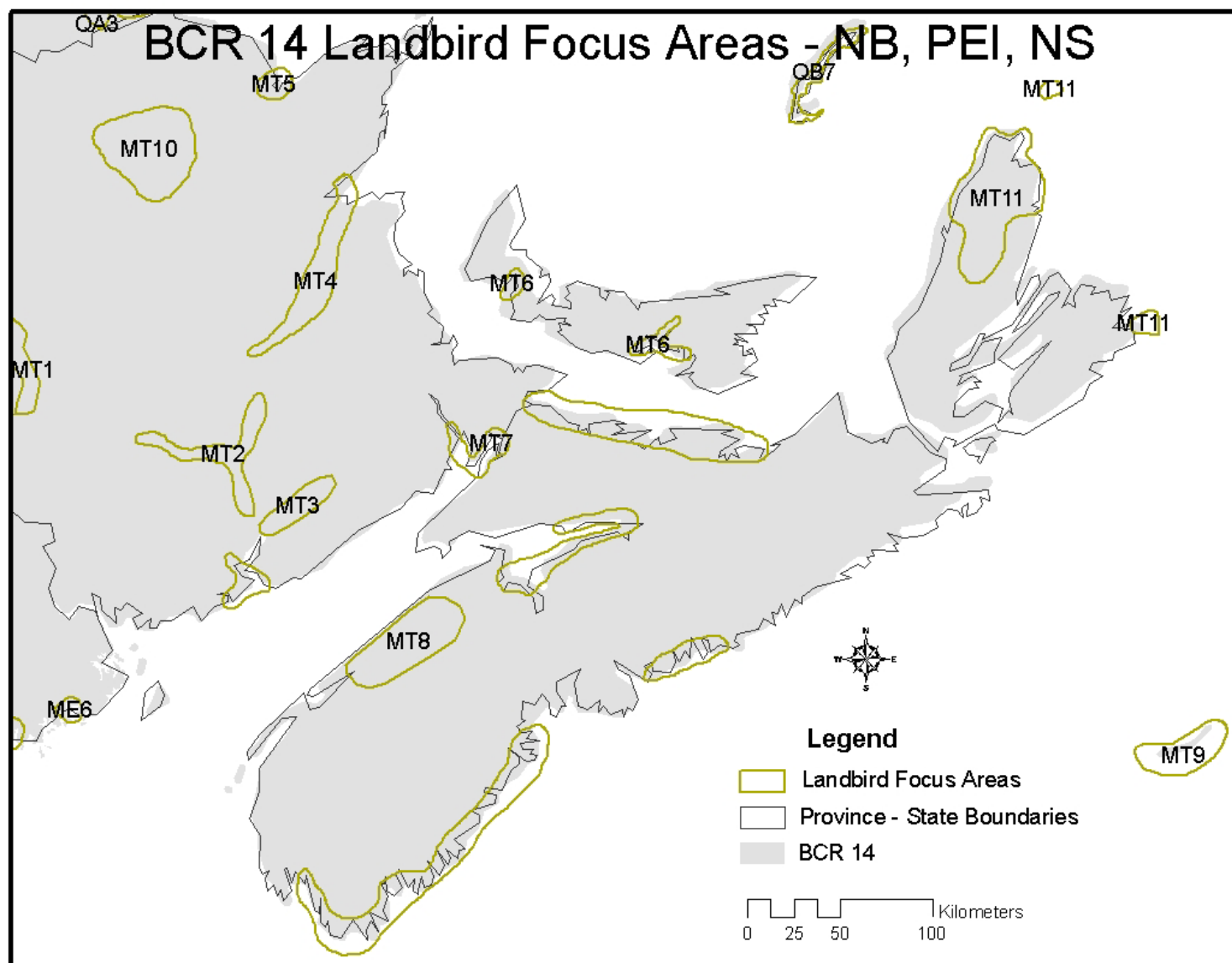


Fig. 13. Map of landbird focus areas in New Brunswick, Prince Edward Island, and Nova Scotia, plus Magdelein Island and Sable Island: [MT2](#), [MT3](#), [MT6](#), [MT7](#), [MT8](#), [MT9](#), [MT11](#), and [QB7](#).

Name of focus area (with coordinates)	Mid-Saint John River/Grand Lake (Map Reference – MT 2)
State(s), Province(s)	New Brunswick
Site description	Mostly a human created grassland complex. Includes the St John river valley, Oromoncto river valley, Grand Lake area and large grass dominated area within Canadian Forces Base Gagetown between Fredericton and Evandale. Seasonally flooded grassland (largest in Atlantic Canada) is a significant component in this area.
Importance to this bird group	This is an area of concentrated breeding habitat. Large numbers of Nelson's Sharp-tailed Sparrow breed in this area.
Importance to other bird groups	Large numbers of waterfowl stage in this area during migration, large numbers of Wood Ducks and Common Goldeneye breed here as well as good numbers of bitterns and rails. Area contains largest area of floodplain forest in the Maritimes.
Current and potential Threats	Current threats include rates and extent of flood plain forest harvesting and conversion of seasonally flooded grasslands to permanent wetlands by Ducks Unlimited. Potential threats include impacts of pesticides and changing farming practices.
Protected status or area designation	Partially (approximately 25%, all Crown land area) is in a Provincially designated Protected Area (complete habitat protection). All floodplain wetlands are designated Provincially Significant Wetlands and no development within 30 meters is permitted.
Conservation action needed	Monitoring the distribution and status of priority bird species in this area. Determining the impact of DU conversion areas and loss of floodplain forest on associated bird populations, especially for priority species. Monitoring/determining the amounts, distribution and expected changes of grassland habitats in this area
References	None.
Key contacts (e-mail)	Kevin Connor (kevin.connor@gnb.ca)

Name of focus area (with coordinates)	Sussex (Map Reference – MT 3)
State(s), Province(s)	New Brunswick
Site description	Human created grassland complex. Includes the Kennebecasis river valley area between Hampton and Penobsequis. Dairy farming is the dominate form of farming.
Importance to this bird group	This is an area of concentrated breeding habitat. Nelson's Sharp-tailed Sparrow breed in this area.
Importance to other bird groups	Moderate numbers of waterfowl stage in this area during migration.
Current and potential Threats	Early hay cutting may be a threat in this area given the large number of dairy farms. No other current threats identified. Potential threats include impacts of pesticides and changing farming practices.
Protected status or area designation	All floodplain wetlands are designated Provincially Significant Wetlands and no development within 30 meters is permitted.
Conservation action needed	Monitoring the distribution and status of priority bird species in this area. Determining the extent and impact of early haying on priority grassland bird species. Monitoring/determining the amounts, distribution and expected changes of grassland habitats in this area
References	None.
Key contacts (e-mail)	None.

Name of focus area (with coordinates)	Prince Edward Island (Map Reference – MT 6)
State(s), Province(s)	PEI
Site description	Grassland/Agricultural Complex Coastal Salt Marsh
Importance to this bird group	Exceptional man-made habitat to a suite of grassland birds that are in decline. Coastal Marsh and grassland areas of importance to Sharp-tailed Sparrow
Importance to other bird groups	Important waterfowl staging; important shorebird feeding, staging and, in the case of Willet, breeding
Current and potential Threats	Decline of the farming industry. Pressure for farms to become more efficient by intensive pesticide and fertilizer use, improving marginal lands, increased monoculture (potatoes). Loss of salt marsh to development
Protected status or area designation	Salt marshes are protected now. No control of grassland and agricultural areas.
Conservation action needed	Continued protection of salt marshes and coastal grasslands. Research and cooperative agreements with farm landowners to allow better management practices
References	
Key contacts (e-mail)	Rosemary Curley - frcurley@gov.pe.ca Dan Busby – Dan.Busby@ec.gc.ca Dan McAskill – jdmcaskill@gov.pe.ca

Name of focus area (with coordinates)	New Brunswick-Nova Scotia Border Region (Map Reference – MT 7)
State(s), Province(s)	New Brunswick, Nova Scotia
Site description	Mostly a human created grassland complex. Dyked lands are a significant component in this area.
Importance to this bird group	This is an area of concentrated breeding habitat.
Importance to other bird groups	Large numbers of waterfowl stage and breed in this area, as well as good numbers of bitterns and rails. Area contains largest area of dyked lands in the Maritimes.
Current and potential Threats	Early hay cutting may be a threat in this area. No other current threats identified. Potential threats include impacts of pesticides, changing farming practices and land development.
Protected status or area designation	There is some area with National Wildlife Area status and a very small area with park status. All coastal wetlands are designated Provincially Significant Wetlands and no development within 30 meters is permitted
Conservation action needed	Monitoring the distribution and status of priority bird species in this area. Monitoring/determining the amounts, distribution and expected changes of grassland habitats in this area.
References	None.
Key contacts (e-mail)	Al Hanson (CWS, Sackville, NB)

Name of focus area (with coordinates)	Annapolis Valley (Map Reference – MT 8)
State(s), Province(s)	Nova Scotia
Site description	Grasslands, agricultural, orchard
Importance to this bird group	Important area for grassland species, many of which are in decline
Importance to other bird groups	
Current and potential Threats	Changes in agriculture – pesticides, wetland drainage, monocultures – reduce diversity of food species. Shorter rotation of hay crop brings cutting times in to overlap with nesting times.
Protected status or area designation	None
Conservation action needed	Continued protection of salt marshes and coastal grasslands. Research and cooperative agreements with farm landowners to allow better management practices
References	
Key contacts (e-mail)	Dan Busby – Dan.Busby@ec.gc.ca Joe Nocera - nocera@unb.ca

Name of focus area (with coordinates)	Sable Island (Map Reference – MT 9)
State(s), Province(s)	Nova Scotia
Site description	Coastal/Island Dune for Ipswich Sparrow
Importance to this bird group	Critical – only location this subspecies breeds
Importance to other bird groups	Other island breeders present but none known to be critical
Current and potential Threats	Currently none. Theoretically – climate change and rising sea levels; changes to land ownership (although none predicted)
Protected status or area designation	Migratory Bird Sanctuary
Conservation action needed	Population and genetics studies; wintering area importance and threats
References	
Key contacts (e-mail)	Dan.Busby@ec.gc.ca Andy Horn – aghorn@is.dal.ca

Name of focus area (with coordinates)	Northern Cape Breton Island, Scaterie Island, St. Paul Island, Nova Scotia (Map Reference – MT 11)
State(s), Province(s)	Nova Scotia
Site description	Two offshore Islands, dominated by stunted fir and spruce. The northern tip of the northern peninsula, a high, plateau region topped with stunted spruce and fir and subjected to high snow cover and insect outbreaks. All natural habitat.
Importance to this bird group	Perhaps the best BITH sites in the Maritimes.
Importance to other bird groups	Other high elevation species such as Blackpoll Warbler and Fox Sparrow.
Current and potential Threats	No immediate threats
Protected status or area designation	Cape Breton Highlands National Park protects significant proportion of the total area – perhaps as much as half the BITH population in the area.
Conservation action needed	Official protection of the two islands and the Cape North part of the northern peninsula.
References	
Key contacts (e-mail)	Dan.Busby@ec.gc.ca

Name of focus area (with coordinates)	Îles de la Madeline (Map Reference – QB 7)
State(s), Province(s)	Québec
Site description	Coniferous forests propitious for Bicknell's Thrush on islands in the Gulf of St. Lawrence
Importance to this bird group	Low importance – small population ; Bicknell's is quite rare over there
Importance to other bird groups	Moderate – Many mature conifer forest priority species nest on the archipelago but these forests cover small areas
Current and potential Threats	Atmospheric deposition, global climate change
Protected status or area designation	None
Conservation action needed	Habitat protection, surveys to clarify status
References	
Key contacts (e-mail)	Yves Aubry <yves.aubry@ec.gc.ca> Jean Gauthier <jean.gauthier@ec.gc.ca> Gilles Falardeau <gilles.falardeau@ec.gc.ca>

Name of focus area (with coordinates)	Habitat Units depicted on “A Conservation Assessment of Bicknell’s Thrush Habitat in the Northeastern U.S.” – Lambert 2002 (see map on next page)
State(s), Province(s)	NY, VT, NH, ME
Site description	See map - Note unprotected sites near Saddleback Mtn, ME and just south of Maine/Quebec border - Note habitat “core areas” of the Adirondacks and White Mtns
Importance to this bird group	Map depicts location of potential Bicknell’s Thrush breeding habitat in the U.S.; importance values can be produced for any habitat unit or combination of units
Importance to other bird groups	Areas also include breeding habitat for Blackpoll Warbler and Yellow-bellied Flycatcher
Current and potential Threats	See BITH species assessment sheet
Protected status or area designation	- 27% of U.S. habitat in forest preserve - 37% in national forest - 7% in state forest/ME public reserve lands - 10% in other conservation ownership
Conservation action needed	- Acquisition/easement near Saddleback Mtn, ME - Favorable habitat management in high timberlands of Maine - Protection of natural landcover and natural disturbance processes in large units of public lands
References	
Key contacts (e-mail)	Dan Lambert <dlambert@vinsweb.org>, Chris Rimmer <crimmer@vinsweb.org>, Kent McFarland <kmcfarland@vinsweb.org>

A Conservation Assessment of Bicknell's Thrush Habitat in the Northeastern U.S.



Vermont Institute of Natural Science

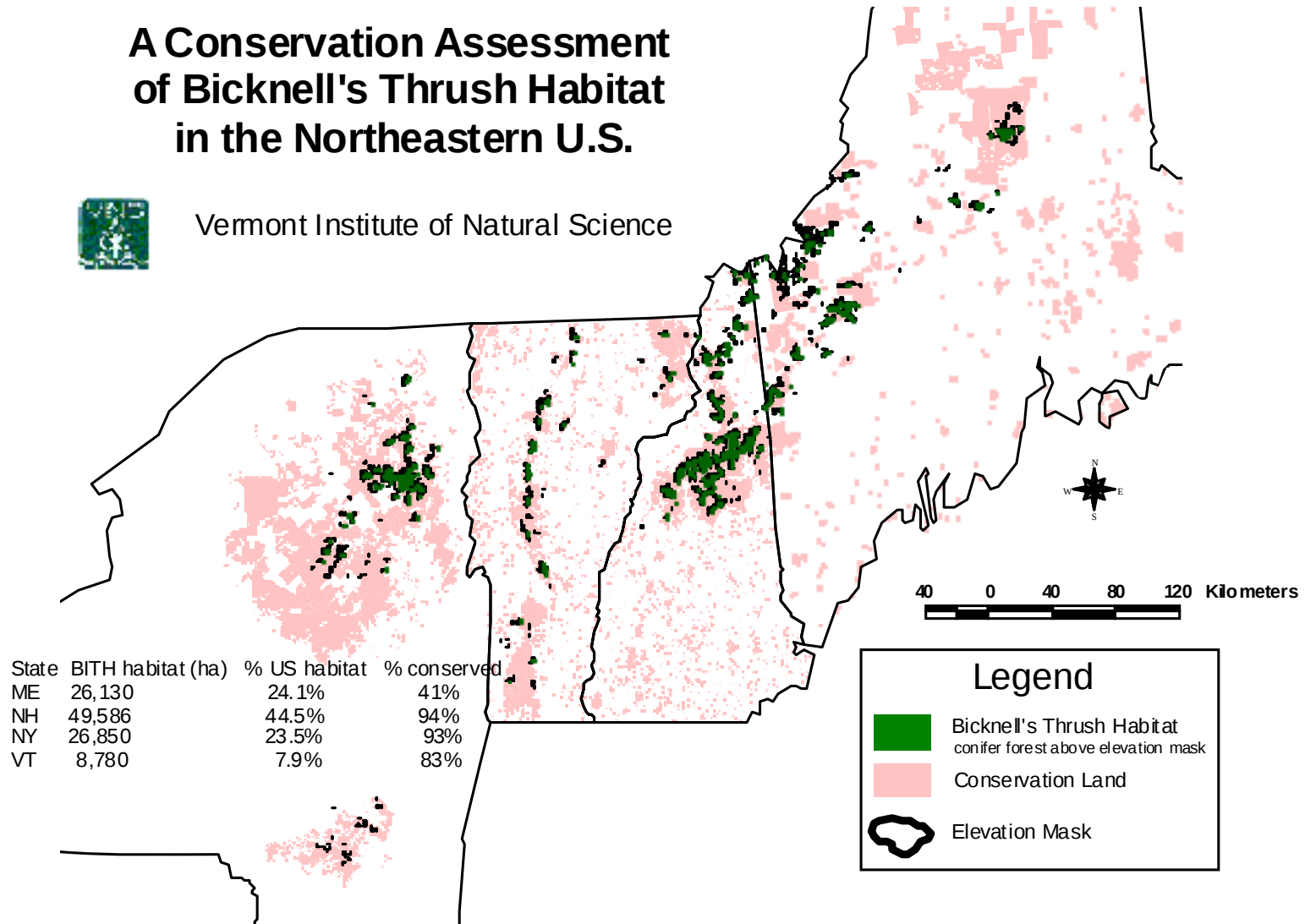


Fig. 14. Map of predicted Bicknell's Thrush habitat and conserved land in the U.S. portion of BCR 14.

Waterfowl Focus Areas

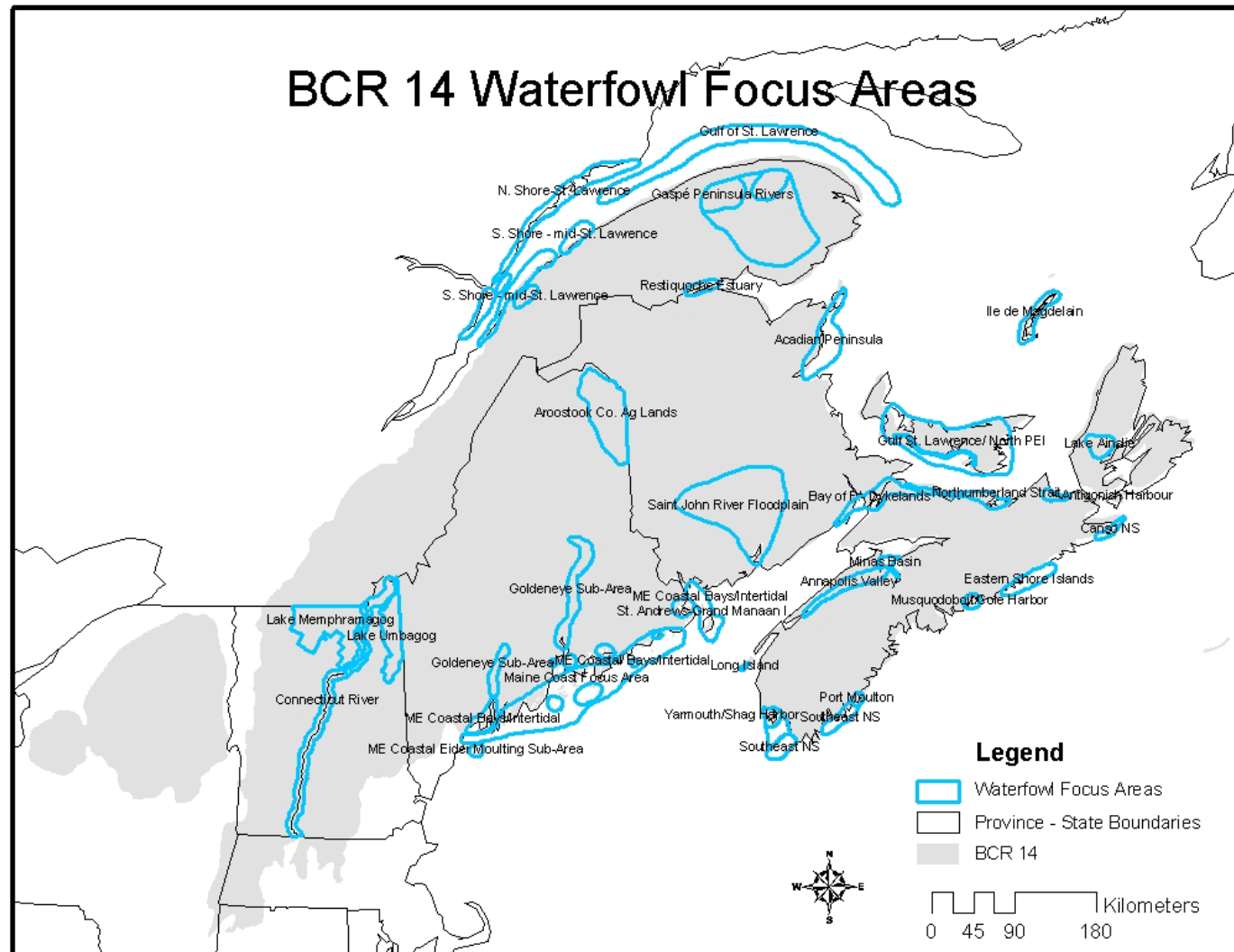


Fig.15. Map of waterfowl focus areas (outlined in light blue) in BCR 14. See the following page for more information on where to find descriptions of these focus areas.

Waterfowl Focus Areas are presented in the following pages by groupings of provinces/states, with more detailed maps of each sub-region, followed by data sheets for the corresponding Focus Areas:

- Waterfowl focus areas in Nova Scotia, Prince Edward Island, southern New Brunswick ([click for map](#)) include: [Minas Basin](#), [Annapolis Valley](#), [Digby-Brien Island](#), [Yarmouth/Shag Harbor](#), [Southeast Nova Scotia](#), Port Moulton (no data sheet), [Musquodobit/Cole Harbor/Lawrencetown](#), [Eastern Shore Islands Management Unit](#), [Canso Nova Scotia](#), [Lake Ainslie](#), [Antigonish Harbor](#), [Northumberland Strait-Nova Scotia](#), [Northumberland Strait-PEI](#), [Gulf of St. Lawrence/North PEI](#), [Bay of Fundy Dykelands](#), [St. John River Floodplain](#), and St. Andrews to Grand Manan Island (no data sheet).
- Waterfowl focus areas in Quebec, northern New Brunswick, and northern Maine ([click for map](#)) include: [North Shore of St. Lawrence Estuary](#), [South Shore of mid-St. Lawrence Estuary](#), Gulf of St. Lawrence (no data sheet), [Gaspé Peninsula Rivers](#), [Restigouche Estuary](#), Magdalen Islands, [Tabusintac/Acadian Peninsula](#), and [Aroostook County Agricultural Lands](#).
- Waterfowl focus areas in Coastal Maine ([click for map](#)) include: [Coastal Maine Focus Area](#), [Ile au Haux Sub-focus Area](#), [Eider Moulting Sub-focus Area](#), [Bays and Intertidal Zones](#), and [Goldeneye Sub-focus Area](#).
- New Hampshire and Vermont ([click for map](#)) include: Lake Umbagog, Connecticut River, and Lake Memphramagog. Data sheets have not been completed for these three focus areas, but they have already been identified as focus areas by the Atlantic Coast Joint Venture and further information can be obtained on the [ACJV website](#).

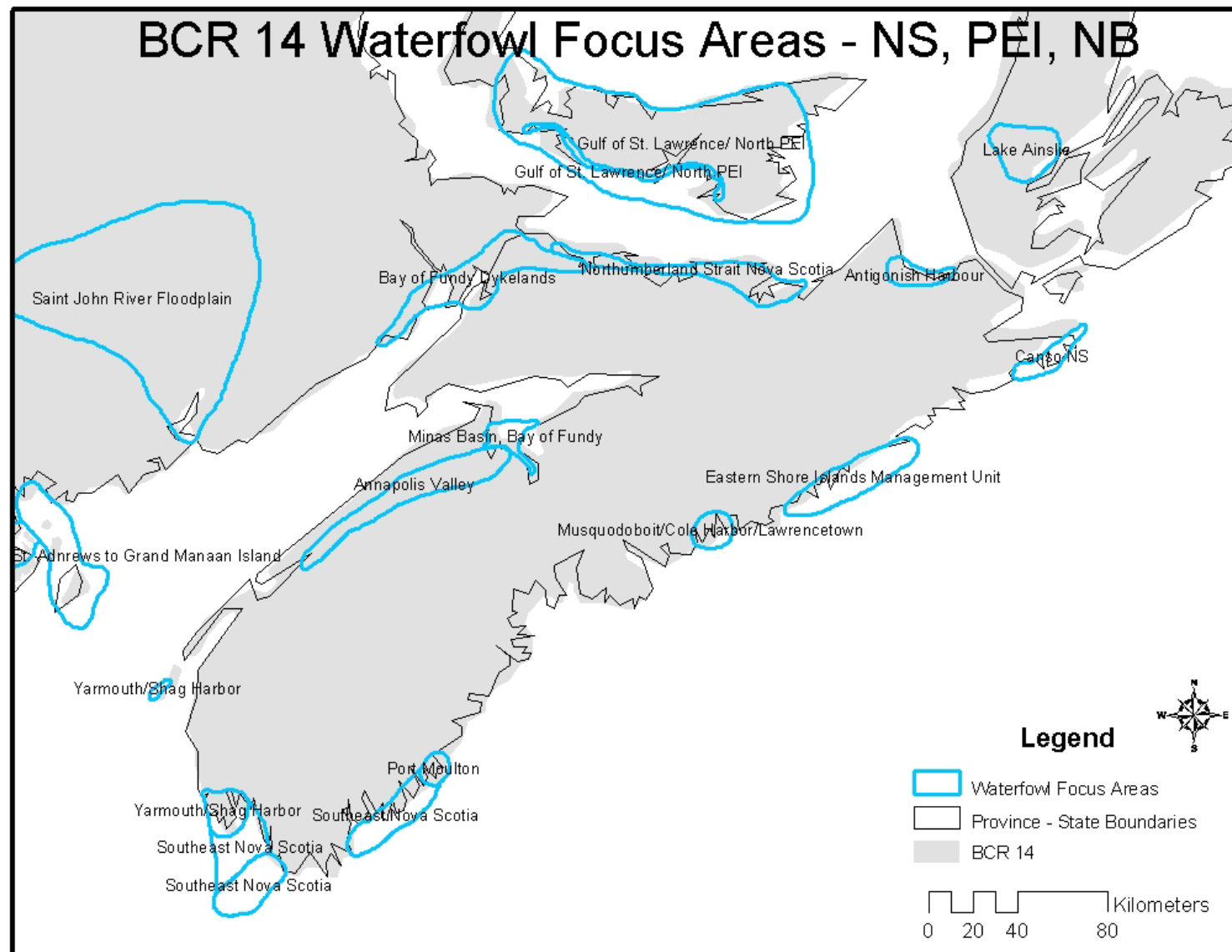


Fig. 16. Map of Waterfowl Focus Areas in Nova Scotia, Prince Edward Island, and southern New Brunswick.

Name of focus area (with coordinates)	Minas Basin, Bay of Fundy
State(s), Province(s)	Nova Scotia
Site description	Tidal mud flat Saltmarsh Agricultural fields
Importance to this bird group	Wintering habitat for ABDU and CAGO Moulting area for ABDU
Importance to other bird groups	Shorebirds
Current and potential Threats	Contaminants Highway construction Shipping
Protected status or area designation	Small provincial wildlife management area.
Conservation action needed	Maintain winter inventory
References	
Key contacts (e-mail)	Randy Milton, NS Dept. of Natural Resources

Name of focus area (with coordinates)	Annapolis Valley
State(s), Province(s)	Nova Scotia
Site description	Alluvial lands and dyked marshes of Annapolis River from Wolfville to Annapolis Royal.
Importance to this bird group	High density ABDU breeding area with AGWT, BWTE, and RNDU. Fall staging ABDU and CAGO
Importance to other bird groups	
Current and potential Threats	Agricultural drainage Peat extraction; Cranberry bog.
Protected status or area designation	None
Conservation action needed	Integrated land-use planning
References	
Key contacts (e-mail)	Randy Milton, NS Dept of Natural Resources

Name of focus area (with coordinates)	Digby-Brien Island
State(s), Province(s)	Nova Scotia
Site description	Coastal waters of St. Mary's Bay from Brien Island to Digby, NS.
Importance to this bird group	Wintering area for SUSC, COEI, and COGO.
Importance to other bird groups	
Current and potential Threats	Ecotourism
Protected status or area designation	
Conservation action needed	Integrated management plan
References	
Key contacts (e-mail)	Keith.mcaloney@ec.gc.ca

Name of focus area (with coordinates)	Yarmouth/Shag Harbor
State(s), Province(s)	Nova Scotia
Site description	Coastal saltmarsh Eel grass flats; Estuaries; Mud flats; Cobble beaches
Importance to this bird group	Critical wintering area for ABDU, CAGO, and GRSC; Critical breeding area for COEI on coastal islands.
Importance to other bird groups	Shorebirds Waterbirds (specifically seabirds)
Current and potential Threats	Recreational development; Oil spills; Rockweed harvest; Aquaculture; Ecotourism
Protected status or area designation	Several islands are crown-owned along with some salt marsh; Small waterfowl sanctuary
Conservation action needed	Continue purchase of coastal islands; Wildlife Management Area designation.
References	
Key contacts (e-mail)	Randy Milton, NS Dept. of Natural Resources

Name of focus area (with coordinates)	Southeast Nova Scotia
State(s), Province(s)	Nova Scotia
Site description	Port Mouton to Barrington south shore. Coastal bays and estuaries and offshore waters
Importance to this bird group	Moulting area for 25,000 COEI Wintering area for ABDU and CAGO
Importance to other bird groups	
Current and potential Threats	Aquaculture expansion
Protected status or area designation	2 Federal sanctuaries – Port Tali and Port Hebert for wintering CAGO
Conservation action needed	Integrated coastal zone management to preserve moulting areas.
References	
Key contacts (e-mail)	Keith McAloney@ec.gc.ca

Name of focus area (with coordinates)	Musquodobit/Cole Harbor/Lawrencetown
State(s), Province(s)	Nova Scotia
Site description	Coastal saltmarsh; Eel grass flats; Mud flats; Estuary; Sand dunes
Importance to this bird group	Critical wintering habitat for ABDU and CAGO.
Importance to other bird groups	Shorebirds Waterbirds Landbirds
Current and potential Threats	Urban and recreational development Oil spills Loss of eel grass beds
Protected status or area designation	Provincial waterfowl sanctuary Provincial Park for approximately half the area
Conservation action needed	Purchase of islands and securement of buffer zone around sanctuary.
References	
Key contacts (e-mail)	Randy Milton, NS Dept. of Natural Resources

Name of focus area (with coordinates)	Eastern Shore Islands Management Unit
State(s), Province(s)	Nova Scotia
Site description	Coastal islands, partially crown owned, some islands grassy while others in different degrees of forest cover (mostly spruce/fir), beeches ????? where present, most island with cliff.
Importance to this bird group	Critical breeding habitat for COEI; Important wintering habitat for HADU and LTDU; Important staging area for SUSC.
Importance to other bird groups	Sea birds and landbirds
Current and potential Threats	Oil spills; Development of privately owned islands; Ecotourism; Aquaculture.
Protected status or area designation	Provincial Wildlife Management Area
Conservation action needed	Purchase of privately held islands Expansion of Management Area
References	
Key contacts (e-mail)	Randy Milton, NS Dept. of Natural Resources

Name of focus area (with coordinates)	Canso NS
State(s), Province(s)	Nova Scotia
Site description	Bays of Atlantic ocean – Larry’s river to Canso
Importance to this bird group	Spring staging of SUSC and COEI
Importance to other bird groups	
Current and potential Threats	Aquaculture expansion
Protected status or area designation	None
Conservation action needed	Integrated coastal zone management to migration habitat.
References	
Key contacts (e-mail)	Keith.mcaloney@ec.gc.ca

Name of focus area (with coordinates)	Lake Ainslie
State(s), Province(s)	Nova Scotia
Site description	Inland lake with shallow emergent bays and coves
Importance to this bird group	Breeding: COGO – only breeding area in province of any significance.
Importance to other bird groups	
Current and potential Threats	Recreational and urban development.
Protected status or area designation	None
Conservation action needed	Purchase or secure buffer strip around breeding and brood rearing sites Maintain nest box program.
References	
Key contacts (e-mail)	Randy Milton, NS Dept. of Natural Resources

Name of focus area (with coordinates)	Antigonish Harbour
State(s), Province(s)	Nova Scotia
Site description	Eel grass flats and Estuary
Importance to this bird group	Wintering: CAGO, ABDU, COGO
Importance to other bird groups	Shorebirds, waterbirds
Current and potential Threats	Oil spills
Protected status or area designation	Provincial sanctuary
Conservation action needed	
References	
Key contacts (e-mail)	Randy Milton NS Department of Natural Resources

Name of focus area (with coordinates)	Northumberland Strait Nova Scotia
State(s), Province(s)	Nova Scotia
Site description	Shallow bays and intertidal flats from New Brunswick border to Pictou, Nova Scotia.
Importance to this bird group	Migration for ABDU, CAGO, GRSC; Winters some BAGO Breeding – high density ABDU breeding zone.
Importance to other bird groups	
Current and potential Threats	Cottage development Aquaculture expansion Decline in eel grass beds
Protected status or area designation	One National Wildlife Area Rest unprotected
Conservation action needed	Integrated coastal zone management Eel grass bed inventory
References	
Key contacts (e-mail)	Keith.McAloney@ec.gc.ca

Name of focus area (with coordinates)	Northumberland Strait
State(s), Province(s)	Prince Edward Island
Site description	Coastal bays and estuaries Eel grass flats
Importance to this bird group	Wintering: ABDU, COGO, LTDU
Importance to other bird groups	Shorebirds
Current and potential Threats	Development
Protected status or area designation	None
Conservation action needed	
References	
Key contacts (e-mail)	Randy Dibblee Keith McAloney

Name of focus area (with coordinates)	Gulf of St. Lawrence/ North PEI
State(s), Province(s)	Prince Edward Island
Site description	Coastal bays and estuaries Eel grass flats Agricultural fields (staging CAGO) Freshwater wetlands (breeding ABDU)
Importance to this bird group	Staging: ABDU, CAGO Wintering: BAGO Breeding: ABDU
Importance to other bird groups	Shorebirds Waterbirds
Current and potential Threats	Aquaculture; Development; Habitat degradation - agriculture
Protected status or area designation	Scattered Management Units
Conservation action needed	
References	
Key contacts (e-mail)	Randy Dibblee Keith McAloney

Name of focus area (with coordinates)	Bay of Fundy Dykelands
State(s), Province(s)	NS/NB
Site description	150,000 acres of dyked marshes and associated saltmarsh and mud flats in Shepody and Chignecto Bays.
Importance to this bird group	Breeding: primary breeding area for ABDU, RNDU, BWTE, AMWI Moulting for WODU
Importance to other bird groups	Shorebirds – migration Upland game birds – pheasant
Current and potential Threats	Intensifying agriculture Urban expansion
Protected status or area designation	3 National Wildlife Areas
Conservation action needed	Integrated land use planning Habitat conservation via stewardship
References	
Key contacts (e-mail)	Keith.McAloney@ec.gc.ca

Name of focus area (with coordinates)	Saint John River Floodplain
State(s), Province(s)	New Brunswick
Site description	Riparian hardwood and floodplain marshes from head of tide upstream to Hawkshaw, including Grand Lake. Approximately 40,000 acres
Importance to this bird group	Major NB black duck breeding area, wood duck, common goldeneye and most southerly colony of GRSC. Spring staging of all dabbling and diving duck species before ice-out on inland areas. Fall staging and migration for ABDU, COGO, BAGO, and GRSC.
Importance to other bird groups	
Current and potential Threats	Loss of cavity trees to forestry (i.e. pulp mills); Urban development; Cranberry farm development on wetlands.
Protected status or area designation	10,000 acres National Wildlife Area (CWS) 300 acres sanctuary 6,000 acres Provincial WMA.
Conservation action needed	Improved forestry practices; Land securement.
References	
Key contacts (e-mail)	Kevin Conner – Kevin.conner@qub.ca Keith McAloney

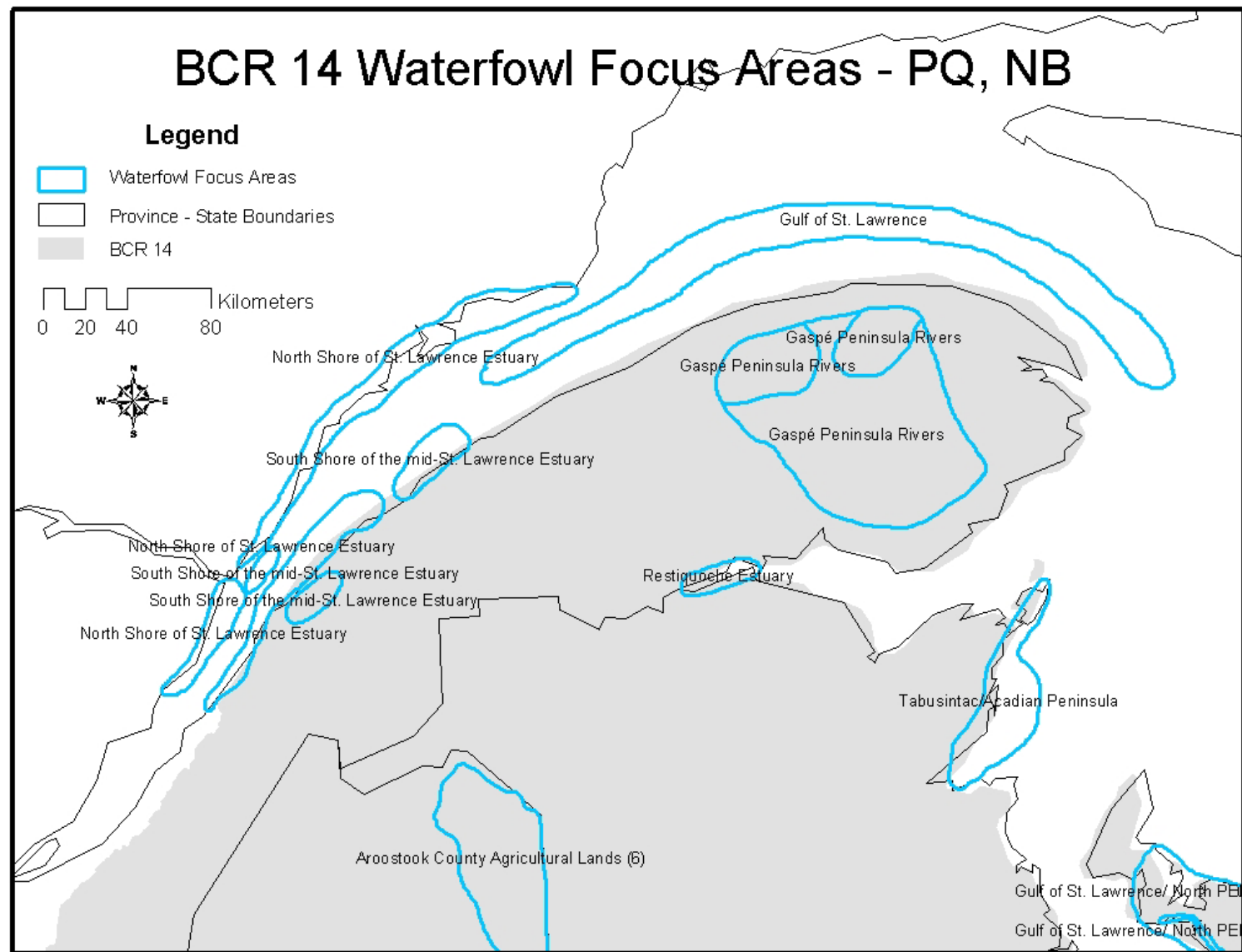


Fig. 17. Map of Waterfowl Focus Areas in Quebec, northern New Brunswick, and northern Maine.

Name of focus area (with coordinates)	North Shore of St. Lawrence Estuary
State(s), Province(s)	Quebec
Site description	La Malbaie to Point-des-Monts Habitat types: estuarine open water nearshore marine.
Importance to this bird group	Wintering: BAGO: 70%, ABDU 2,000-4,000 at Grandes-Bergeronnes, COGO 4,000, LTDU up to 40,000 individuals. Molting: BLSC and SUSC – 100,000 ind. Migrating: BLSC and SUSC – 200,000 ind.
Importance to other bird groups	
Current and potential Threats	Oil spills Hunting Contamination
Protected status or area designation	Parc marin du Saguenay
Conservation action needed	Preparedness to oil spills Monitoring wintering, staging, and migrating
References	
Key contacts (e-mail)	Daniel.bordage@ec.gc.ca Christine.lepage@ec.gc.ca P_dulude@ducks.ca

Name of focus area (with coordinates)	South Shore of the mid-St. Lawrence Estuary
State(s), Province(s)	Quebec
Site description	From Kamouraska to Grand-Metis Estuarine open water and emergent marsh, nearshore marine, peatlands (bogs).
Importance to this bird group	Breeding: 25% of NA total <i>dresseri</i> population. Very productive site for ABDU (peatlands). Wintering: BAGO (70% of NA pop.) and COGO (early winter, about 4,000 individuals). Molting: COEI, BLSC, and SUSC Spring migration: ATBR (15% of eastern NA pop).
Importance to other bird groups	
Current and potential Threats	Oil spills; Peatmoss extraction; Hunting; Epidemia within colonies Loss of estuarine emergent marsh (zostera and spartina)
Protected status or area designation	L'Isle-Verte National Wildlife Area; Iles de l'Estuaire National Wildlife Area; Some islands protected by Duvetnor, Inc.
Conservation action needed	Preparedness to oil spills; Peatlands need to be protected; Monitoring: wintering, moulting, and migration Research on epidemia causes (COEI)
References	
Key contacts (e-mail)	Daniel.bordage@ec.gc.ca , christine.lepage@ec.gc.ca , P_dulude@ducks.ca

Name of focus area (with coordinates)	Gaspe Peninsula Rivers
State(s), Province(s)	Quebec
Site description	Rivers: Port-Daniel, Bonaventure, Madeleine, Hall, Ste-Anne, Cascapedia and from Port-Daniel to Newport and Bonaventure Island. Fast running rivers for breeding and estuaries of these rivers and Bonaventure Island for molting.
Importance to this bird group	Breeding, moulting, and staging: HARD
Importance to other bird groups	
Current and potential Threats	Forestry practices Oil spills (offshore) when molting.
Protected status or area designation	Parc National de la Gaspesie Larger riverine strips along salmon rivers.
Conservation action needed	Defer to conservation plan (COSEWIC)
References	
Key contacts (e-mail)	Daniel.bordage@ec.gc.ca , michel.robert@ec.gc.ca , christine.lepage@ec.gc.ca , p_dulude@ducks.ca

Name of focus area (with coordinates)	Restigouche Estuary
State(s), Province(s)	New Brunswick and Quebec
Site description	Shallow tidal estuary from Dalhousie to Campbellton on south side, bounded by Gaspé, Que on north side.
Importance to this bird group	Spring staging 4-5 weeks for 100,000 black scoter (Flyway pop) and 15,000 surf scoter. Winter area for 100-200 Barrows goldeneye
Importance to other bird groups	
Current and potential Threats	Habitat quality and contamination of food chain by 6 pulp mills and one power plant. Potential aquaculture threat
Protected status or area designation	Main BAGO (1 x 7 km coastal strip) closed to hunting No habitat protection
Conservation action needed	Shoreline protection to reduce disturbance Water quality and benthic improvement Monitoring spring migration and winter research on food quality.
References	
Key contacts (e-mail)	Keith McAloney, CWS, Daniel Bordage, Pierre Dulude, and Christine Lepage.

Name of focus area (with coordinates)	Tabusintac/Acadian Peninsula
State(s), Province(s)	New Brunswick
Site description	Near shore waters (shallow coastal bays and lagoons) from Miramichi to Shippegan Island.
Importance to this bird group	Major spring migration for BLSC and SUSC. Fall migration stop-over for ABDU and CAGO.
Importance to other bird groups	Piping Plover
Current and potential Threats	Rapid expansion of aquaculture
Protected status or area designation	Ramsar IBA
Conservation action needed	Preservation of access to migration habitat.
References	
Key contacts (e-mail)	Keith.mcaloney@ec.gc.ca

Name of focus area (with coordinates)	Aroostook County Agricultural Lands (6)
State(s), Province(s)	Maine
Site description	Agricultural lands and associated freshwater lakes, rivers, ponds, bogs, and emergent marshes. Agriculture primarily potatoes, barley, and wheat.
Importance to this bird group	Key stopover areas during fall migration for a significant portion of the NAP CAGO population. Myriad of wetlands important for waterfowl breeding habitat. Occasional GSGO stopover.
Importance to other bird groups	Important to grassland birds.
Current and potential Threats	Development, potential wide scale changes in land use and/or farming practices.
Protected status or area designation	Limited conservation ownership on those privately-owned agricultural lands. Some refuge ownership (Aroostook NWR) but different land use (not ag. lands).
Conservation action needed	Landowner agreements; Acquisition of grasslands important to that group; Research
References	Brad Allen
Key contacts (e-mail)	Brad.allen@state.me.us

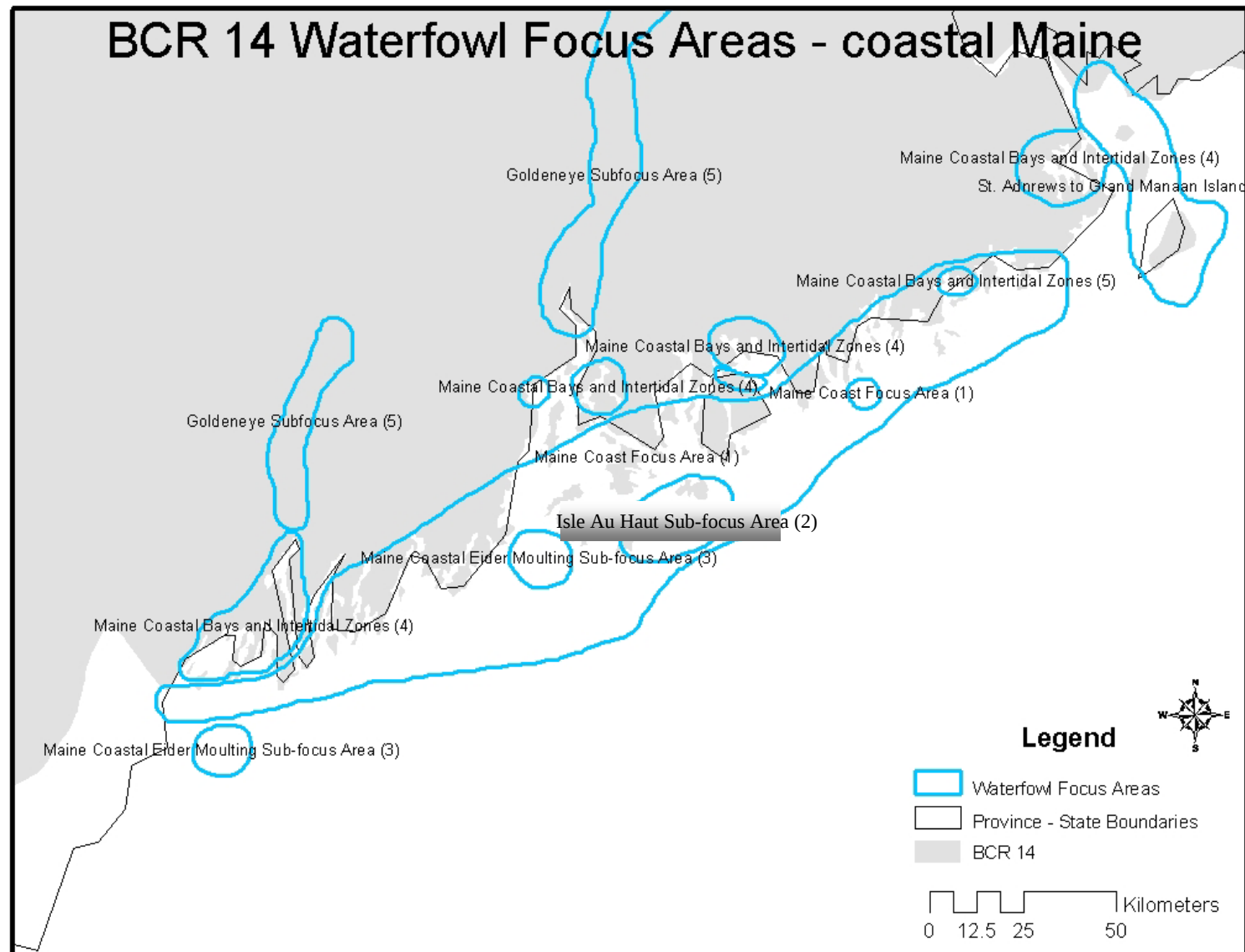


Fig. 18. Map of Waterfowl Focus Areas in coastal Maine.

Name of focus area (with coordinates)	Maine Coast Focus Area (1)
State(s), Province(s)	Maine
Site description	Coastal bays, estuaries, coastal islands, rocky coastline, marine open water.
Importance to this bird group	ATBR – spring migration, COGO – wintering, COEI – wintering and breeding/nesting islands, LTDU – wintering, SUSC – wintering, BLSC – migration
Importance to other bird groups	Broad importance to numerous species year-round.
Current and potential Threats	Development along shoreline and islands; Oil spills Aquaculture
Protected status or area designation	Many protected nesting islands and shoreline by government and various NGO's.
Conservation action needed	Continue acquisition of key islands and islands and mainland parcels; Research on COEI survival, improved monitoring of sea ducks in general
References	Brad Allen
Key contacts (e-mail)	Brad.allen@state.me.us

Name of focus area (with coordinates)	Isle au Haut Sub-focus area (2)
State(s), Province(s)	Maine
Site description	Rocky coastline along islands of various sizes, offshore marine open water.
Importance to this bird group	Key wintering area for E. population of HARD; also includes COEI breeding and wintering habitat. Migration habitat for SUSC and BLSC.
Importance to other bird groups	Purple sandpipers
Current and potential Threats	Oil spill; Disturbance associated with commercial fisheries where large % of population winters.
Protected status or area designation	Much of shoreline is protected by Acadia National Park; Other islands owned by conservation agencies.
Conservation action needed	Oil spill preparedness; Additional acquisition; Periodic HARD monitoring and survival work.
References	Brad Allen
Key contacts (e-mail)	Brad.allen@state.me.us Glen Mittelhause

Name of focus area (with coordinates)	Maine Coastal Eider Moulting Sub-focus Area (3)
State(s), Province(s)	Maine
Site description	Marine open water habitats
Importance to this bird group	Shallow water likely associated with large concentrations of blue mussels; Undisturbed area.
Importance to other bird groups	
Current and potential Threats	Oil spills and vulnerability associated with large concentrations of birds in a small area.
Protected status or area designation	None – open water marine habitats
Conservation action needed	Oil spill preparedness Better definition of key moulting areas is needed.
References	Brad Allen
Key contacts (e-mail)	Brad.allen@state.me.us

Name of focus area (with coordinates)	Maine Coastal Bays and Intertidal Zones (4)
State(s), Province(s)	Maine
Site description	Estuarine open water, saltmarsh, intertidal zone, coastal bays, coastal shoreline – key areas along the Maine coast for wintering black ducks – includes key areas of ACJV focus areas.
Importance to this bird group	Coastal wintering habitat primarily, but also includes migration and staging habitat as well.
Importance to other bird groups	Shorebird and wading bird feeding habitat, in Cobscook Bay 2 COEI nesting islands. Habitat for many waterfowl species of lower priority.
Current and potential Threats	Shoreline development (residential and industrial); Aquaculture; Oil spill.
Protected status or area designation	Some conservation action directed towards riparian ownership.
Conservation action needed	Shoreline acquisition of key sites; Continued survey and inventory is needed.
References	ACJV Focus Areas Brad Allen
Key contacts (e-mail)	Brad.allen@state.me.us

Name of focus area (with coordinates)	Goldeneye Subfocus Area (5)
State(s), Province(s)	Maine
Site description	Site sub-focus areas; 2 riverine and 4 coastal bays, near shore marine habitat.
Importance to this bird group	Key wintering areas for majority of BAGO wintering in Maine and important migration and wintering habitat for COGO. Also, important to many wintering and migrating waterfowl populations. One subfocus area (Trenton) also important to GRSC.
Importance to other bird groups	
Current and potential Threats	Development; Aquaculture; Harvest Implications for very small BAGO population;
Protected status or area designation	Limited protection at this site. Some shoreline protection with ownerships/easements by NGOs.
Conservation action needed	Restrictions on legal harvest of BAGO in discrete areas; BAGO winter ecology, survival, and movements.
References	Brad Allen
Key contacts (e-mail)	Brad.allen@state.me.us

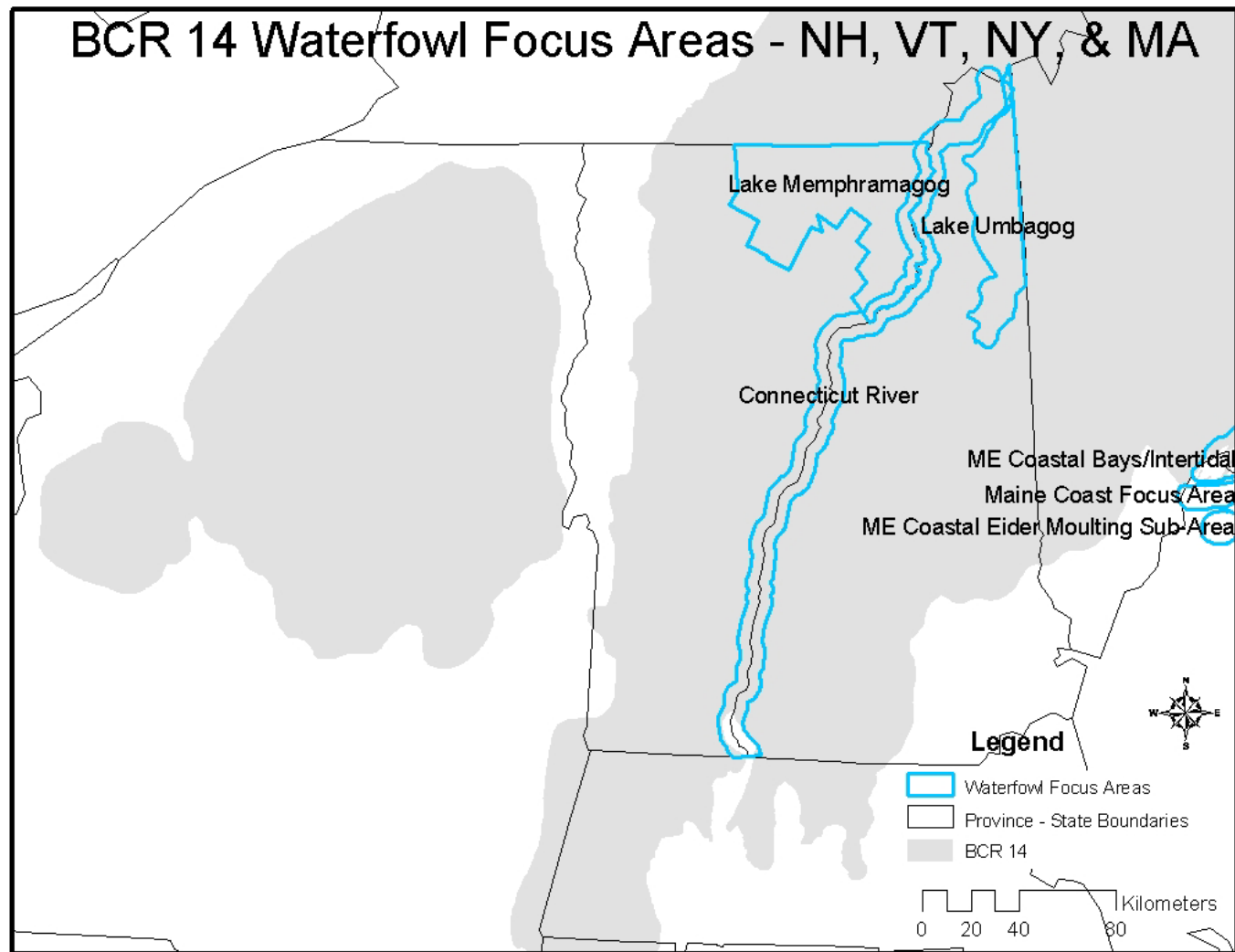


Fig. 19. Map of Waterfowl Focus Areas in New Hampshire and Vermont.

Shorebird Focus Areas

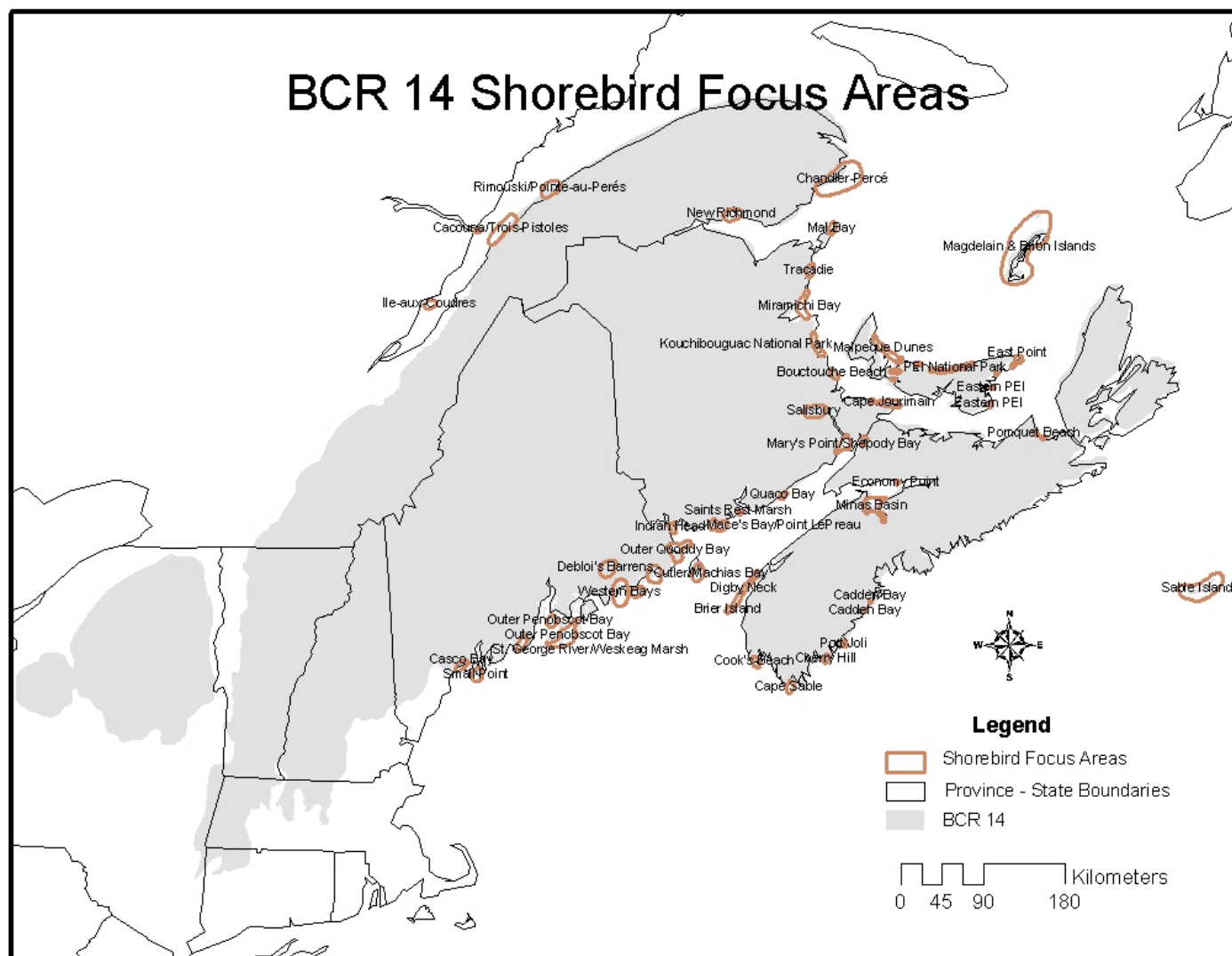


Fig. 20. Map of shorebird focus areas (outlined in brown) in BCR 14. See the following pages for more detailed maps of focus areas around the Bay of Fundy and Gulf of St. Lawrence and a list of focus areas by province/state.

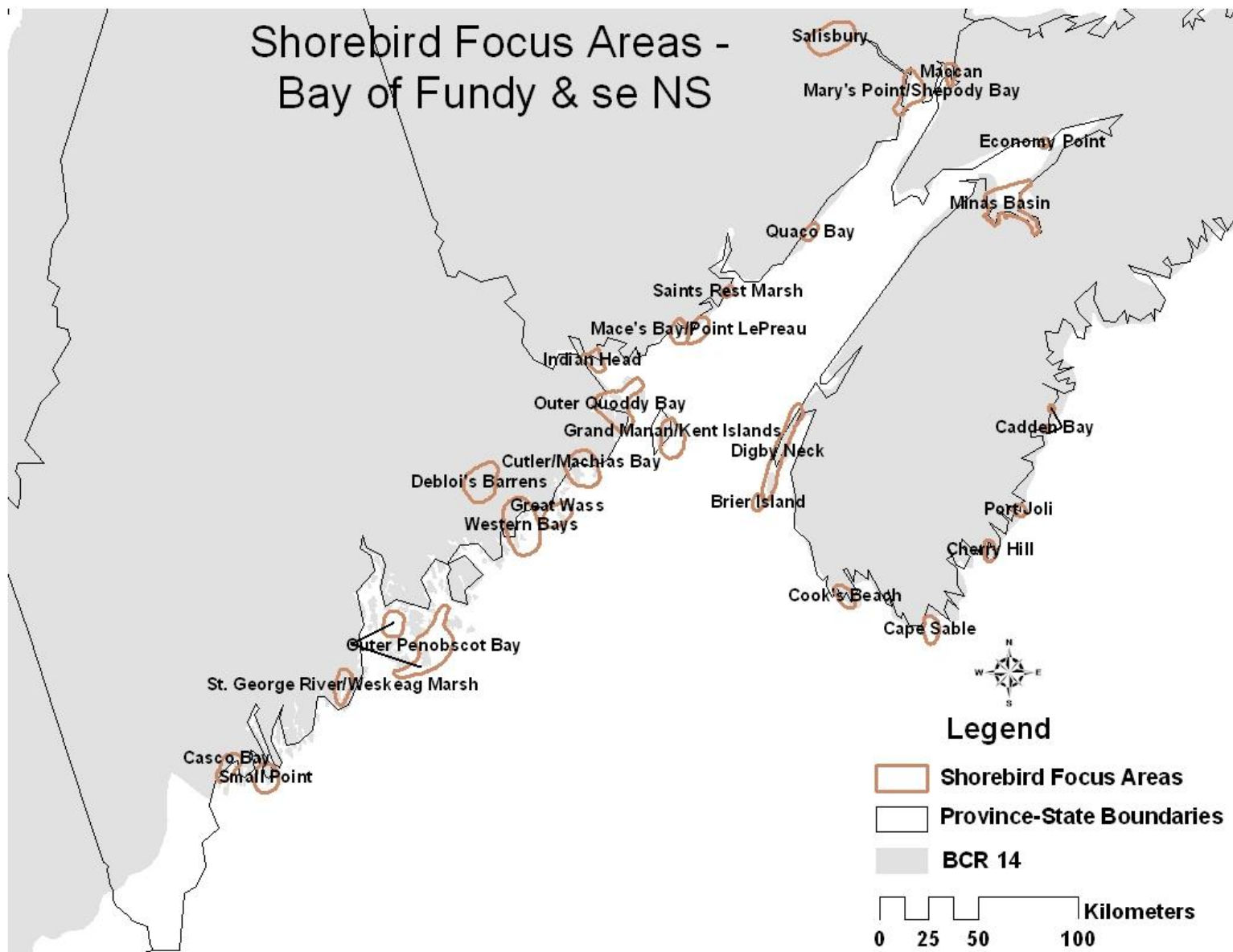


Fig. 21. Shorebird focus areas around the Bay of Fundy and southeastern New Brunswick.

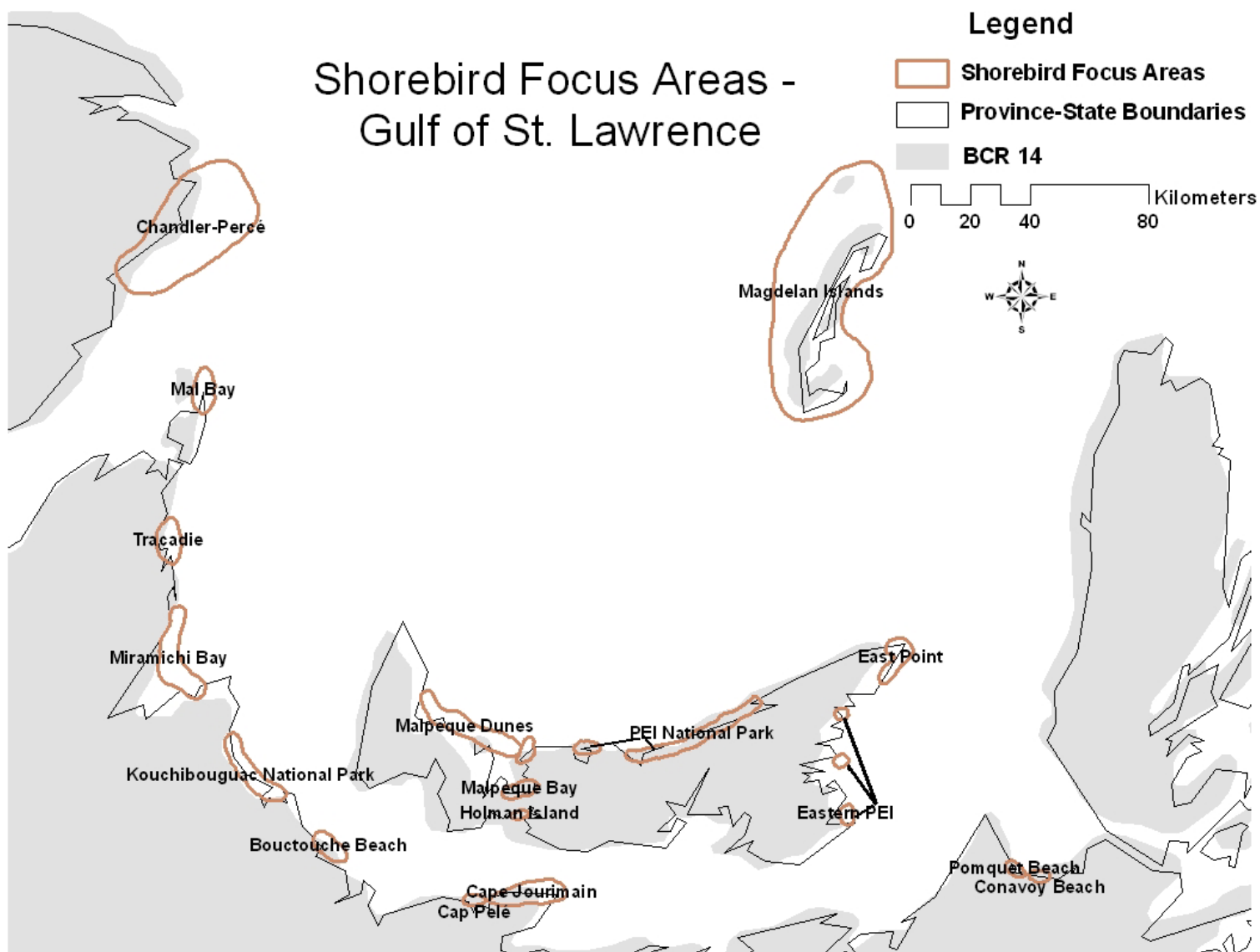


Fig. 22. Shorebird focus areas around the Gulf of St. Lawrence.

More complete descriptions of the shorebird focus areas are being developed, but the following list provides information on general location and the species/season of interest for each area.

Focus Area Name	State/Province	Species/Season of Interest
#1 - Casco Bay	Maine	migrating shorebirds – staging area
#2 - Small Point	Maine	migrating shorebirds and wintering Purple Sandpiper
#3 - St. George River/ Weskeag Marsh	Maine	migrating shorebirds – staging area
#4 – Outer Penobscot Bay	Maine	wintering Purple Sandpiper
#5 – Deblois Barrens	Maine	breeding Upland Sandpiper, stop-over area for Whimbrel
#6 – Western Bays	Maine	migrating shorebirds – staging area
#7 – Great Wass	Maine	migrating shorebirds and wintering Purple Sandpiper
#8 - Culter and Machias Bay	Maine	staging area for migrating shorebirds
#9 – Outer Quoddy Bay	Maine/New Brunswick	staging area for migrating shorebirds
#10 – Indian Head	New Brunswick	wintering Purple Sandpiper
#11 – Grand Manan/ Kent Islands	New Brunswick	staging area for migrating shorebirds
#12 – Mace’s Bay / Point LaPreau	New Brunswick	migrating shorebirds and wintering Purple Sandpiper
#13 – Saints Rest marsh	New Brunswick	staging area for migrating shorebirds
#14 – Quaco Bay	New Brunswick	staging area for migrating shorebirds
#15 – Shepody Bay / Mary’s Point	New Brunswick	staging area for migrating shorebirds
#16 - Maccan	Nova Scotia	staging area for migrating shorebirds
#17 – Economy Point	Nova Scotia	migrating shorebirds and wintering Purple Sandpiper
#18 – Minas Basin	Nova Scotia	staging area for migrating shorebirds
#19 – Digby Neck	Nova Scotia	wintering Purple Sandpiper
#20 – Brier Island	Nova Scotia	staging area for migrating shorebirds
#21 – Cook’s Beach	Nova Scotia	staging area for migrating shorebirds
#22 – Cape Sable	Nova Scotia	staging area for migrating shorebirds
#23 – Cherry Hill	Nova Scotia	staging area for migrating shorebirds
#24 – Port Joli	Nova Scotia	staging area for migrating shorebirds
#25 – Cadden Bay	Nova Scotia	breeding Piping Plover
#26 – Sable Island	Nova Scotia	migrating shorebirds, wintering Purple Sandpiper, breeding Least Sandpiper and Semipalmated Plover
#27 – Conavoy Beach	Nova Scotia	breeding Piping Plover

#28 – Pomquet Beach	Nova Scotia	breeding Piping Plover
#29 – Eastern PEI	Prince Edward Island	breeding Piping Plover
#30 – East Point	Prince Edward Island	breeding Piping Plover
#31 – PEI National Park	Prince Edward Island	breeding Piping Plover and migrating shorebirds
#32 – Malpeque Dunes	Prince Edward Island	breeding Piping Plover
#33 – Malpeque Bay	Prince Edward Island	staging area for migrating shorebirds
#34 – Holman Island	Prince Edward Island	staging area for migrating shorebirds
#35 – Cape Jourmain	New Brunswick	staging area for migrating shorebirds
#36 – Cap Pelé	New Brunswick	breeding Piping Plover
#37 – Buctouche Beach	New Brunswick	breeding Piping Plover
#38 – Kouchibouguac National Park	New Brunswick	breeding Piping Plover
#39 – Miramichi Bay	New Brunswick	breeding Piping Plover
#40 – Tracadie	New Brunswick	breeding Piping Plover
#41 – Mal Bay (??)	New Brunswick	breeding Piping Plover and migrating shorebirds
#42 – New Richmond	Quebec	staging area for migrating shorebirds
#43 – Chandler to Percé	Quebec	migrating shorebirds and wintering Purple Sandpiper
#44 – Rimouski to Pointe-au-Père	Quebec	staging area for migrating shorebirds
#45 – Cacouna to Trois-Pistoles	Quebec	staging area for migrating shorebirds
#46 – Ile Rouge	Quebec	migrating shorebirds and wintering Purple Sandpiper
#47 – Ile-aux-Coudres	Quebec	staging area for migrating shorebirds
#48 – Magdalen Islands	Quebec	breeding areas for Piping Plover, Semipalmated Plover, Least Sandpiper, Greater Yellowlegs, Willet; staging areas for migrating shorebirds
#49 Salisbury	New Brunswick	breeding Upland Sandpiper

Appendix G. Priority projects (conservation, research/monitoring, and education) identified during the BCR 14 workshop held in Maine (December 2002), grouped by major habitat type (coastal, freshwater wetland, forest, agricultural grassland). Also a list of on-going and recently completed research and monitoring projects.

Coastal Habitats

Project Type	Project description and location	Species affected	Key contacts	Possible funding
Conservation Action	Downeast Coastal habitat protection project • Acquisition • Easement • Ongoing work by Maine Coastal Conservancy?	Staging shorebirds Salt marsh landbirds Wintering waterfowl	Linda Welch, USFWS Lindsay Tudor, Maine	NAWCA, land trusts, Pew trusts
	Isle au Haute • Acquisition in association with refuge • Easements • Harvest managements • Invertebrate management • Oil spill planning	Shorebirds Waterbirds Landbirds Waterfowl	Brad Allen, Maine Bruce Connery	NAWCA, land trusts, Pew trusts, SWG
	Kennebec/MMB • Acquisition/ easements • Enforcing discharge permits • outreach	Shorebirds Waterbirds Waterfowl	Sandy Ritchie	SWG, NAWCA, land trusts
	Cobscook Bay • TNC focus area • Acquisition and easements • Regulate discharge from aquaculture	Shorebird Waterfowl Waterbird	Tom Hodgman	TNC, NAWCA, SWG
	St. Lawrence Estuary • Acquisition to fill gaps in current protection	Waterfowl Waterbirds Shorebirds	Quebec Region, CWS	

	(National Wildlife Areas) Ile Rouge, Batture aux Loups Marins, Cacouna,	Landbirds		
	South Shore Gaspé - Waterbird protection is quite complete - Protection needed for inland waterbirds, shorebird, terns - Barachois de Malbaie, Douglastown, Chandler, Bonaventure, New Richmond, Pointe a la Croix	Inland waterbirds Shorebirds Terns Waterfowl	Quebec Region, CWS	
	Magdalen Islands - Acquisition to infill Pointe de l'Est NWA - Human management, particularly on beaches - Acquisition of Havre aux Basques - Bird Rocks, habitat management would increase Gannets (remove buildings)	Waterbirds Waterfowl Shorebirds Landbirds	Quebec Region, CWS	
	Maritime Gulf of St. Lawrence Coast - Development in coastal zone increasing - Acquisition and stewardship of lands necessary for beach and island nesters	Waterbirds Waterfowl Shorebirds	Al Hanson, CWS	
	St. Margaret's Bay, Mahone Bay - Acquisition and stewardship of islands - On-going work	Waterbirds Waterfowl	Andrew Boyne, CWS	
	Upper Bay of Fundy - Acquisition and stewardship of coastal salt marsh and flats - Ongoing work through EHJV	Shorebirds Landbirds	Reg Melanson, EHJV	
Research / Monitoring	Pelagic monitoring - Highlighted by Greater Shearwaters and phalaropes - Currently nothing in US portion and CWS is in a renewal phase - Year round monitoring	Phalaropes Greater Shearwaters Pelagics in general	Tony Lock, CWS Scott Hall, NAS Tom Hodgman	CWS, USFWS, SWG, USGS, NFWF

	Phalarope monitoring • Ask International Shorebird Group to ID phalarope species as focal species • Develop proposal	Shorebirds	Stephen Brown, Manomet John Chardine	
	Great Cormorants • Requirement for surveys and general status assessment (may just require paper exercise or BNA account may cover)	Great Cormorants	Brad Allen Andrew Boyne	
	Shorebird Migration Monitoring (PRISM) • Protocol development • Implementation • Volunteer network • Migration monitoring	Shorebirds	Stephen Brown, Manomet Peter Hicklin, CWS	
	Wintering monitoring Purple Sandpipers (PRISM) and Harlequin Ducks	Purple Sandpipers Harlequin Ducks	Lindsay Tudor, Maine	
	Gulf of St. Lawrence Common Tern work • Issues in PEI, NB, Gaspé, and Magdalen • Determine threats, limiting factors	Terns	Jean-Francois Rail, CWS	
	Seabird colony restoration • Potential exists at several sites throughout BCR for this activity	Waterbirds		
	Develop Salt Marsh Monitoring Program • Needed throughout BCR 14 • Develop implementation network • Salt marsh sparrows highlighted for need	Waterbird Landbird Waterfowl Shorebirds	CWS, Bird Studies Canada Tom Hodgman	CWS, USFWS, USGS, SWG
	Seabird by-catch and oil spill issues • International issues • Need to monitor impact of threats • Develop oil spill plans	Waterbirds Seabirds waterfowl	John Chardine, Tony Lock, CWS	
	Winter surveys for Seaducks throughout BCR 14 • Some surveys already ongoing but	Waterfowl Purple Sandpipers	Keith McAloney, CWS	CWS, USFWS

	maintenance and increases necessary • Population delineation, breeders to wintering sites • Includes loons and grebes	Wintering waterbirds (loons, grebes)	Dan Bordage, CWS Brad Allen, Maine	
	SeaNet Initiative • Long-term monitoring effort to evaluate seabird mortality rates • Volunteers walk beaches monthly to collect seabird mortality data	Waterbirds	David Adams, NY DEC Rebecca Harris, Tufts Univeristy	
Outreach	Coastal ethics outreach and education (BCR-wide) • USFWS Island Ethics brochure	Waterfowl Waterbirds Shorebirds	Various GoM expedition	
	Expand Marine Conservation Education • Look at Puffin Project model	All	Scott Hall	SWG
	Development of Coastal Education Center	All	Linda Welch	
	Control visitor disturbance at Shorebird Roosts • Upper Bay of Fundy and US sites	Shorebirds	Colin Mackinnon, CWS Lindsay Tudor	
	Control recreation And development in coastal marshes • Increase regulatory agency awareness	All	Al Hanson, CWS GoM Program, USFWS Refuge Program USFWS	

Inland Wetlands

Project Type	Project description and location	Species affected	Key contacts	Possible funding
Conservation Action	Guidelines for Man-made Wetlands Develop guidance/recommendations on the importance and management of man-made wetlands. To what extent are man-created wetlands desirable or beneficial to wetland birds in BCR 14? This issue has implications for dam maintenance and re-licensing, and for design, funding, and regulatory review of projects that would create or modify wetlands.	waterbirds, waterfowl, shorebirds	Inland Wetland group	SWG
	Guidelines for Beaver-created Wetlands Develop guidance/ recommendations on the importance of beaver-created wetlands to wetland birds in BCR-14. This issue has implications relative to both local and regional beaver management, including removal of "nuisance" dams, and future modifications of trapping regulations.	waterbirds, waterfowl, landbirds	Inland Wetland group	SWG
Research / Monitoring	Inventories of Inland Wetlands Conduct comprehensive inventories to determine distributions and relative abundances of birds of inland wetlands. Greatest need is in Canadian portions of BCR 14.	Birds associated with inland wetlands	Inland Wetland group	SWG, CWS, USFWS, USGS
	Standardized Monitoring Implement standardized, region-wide monitoring of inland wetland bird abundance and distribution. Monitoring should be coordinated and consistent with monitoring protocols and programs for wetland birds in other BCRs and continent-wide.	Birds associated with inland wetlands	Inland Wetland group	SWG, CWS, USFWS, USGS
	Data Sharing Develop mechanisms for data sharing. Ensure that	Birds associated with inland wetlands	Inland Wetland group	SWG, CWS

	inventory and monitoring data are available to help inform and guide conservation programs, including habitat acquisition and management.			
Outreach/ Education	Coordinate with other BCRs Coordinate with other BCR's south of BCR 14 to ensure that conservation actions are being taken to reduce threats to inland wetland birds and their habitats during migration and in winter. Potential threats include wetland loss or modification, exotic vegetation, disease, oil spills, and wind tower development.	All birds	Inland Wetland group	

Forest Habitats

Project Type	Project description and location	Species affected	Key contacts	Possible funding
Conservation Action	Conservation of early successional species Identify and conserve natural barrens and shrub communities; work with managers of powerline rights-of-way; integrate efforts with those for New England Cottontail and/or Lynx; integrate efforts with others pursuing a strategy for increased funding in 2005	Early successional species	Scot Williamson	LIP
	Protect Bicknell's Thrush habitat Bicknell's Thrush habitat protection needed in parts of CA and ME	Bicknell's Thrush	Tom Hodgman Dan Busby Dan Lambert	LIP, Pew Charitable Trusts
Research / Monitoring	Bird-Habitat Models This BCR requires an integrated bird-habitat/forest model to determine where priority birds currently are, land ownership patterns, what habitat changes are likely in the future, and what habitat bottlenecks might occur in the future. Regional differences, especially	Forest birds	Modeling Subcommittee: John Hagen, Scott Makepeace, Mark Anderson, Andrew Milliken,	USGS, USFWS, TNC, USFS, CWS

	with regard to intensity of forest management, are likely to be very significant. Tools for use by landowners will be useful, at least in some parts of the BCR.		Randy Dettmers, Luc Belanger, John Sauer, Mike Berger, David King	
	Data Directory Compile database/directory of what data sources are available across the region and contact information for each data source		Pam Hunt	SWG
	Bicknell's Thrush 1. Range-wide population assessment and monitoring, especially in ME and parts of CA. 2. Information on natal dispersal and migratory connectivity, information on mercury levels, and analysis of existing data to determine if population is changing. 3. Other species, e.g. Blackpoll Warbler, will be accommodated in monitoring plan. 4. Work is required on wintering grounds in Dominican Republic, Cuba, etc. 5. Encourage states to fund this piece-meal through State Wildlife Grants. 6. Encourage VINS and Andrew Milliken to repackage last year's proposal and submit to Neotropical Act; this work is a consensus high priority for this BCR!	Bicknell's Thrush	Chris Rimmer, Dan Busby	USFWS, CWS, USGS, NFWF, NSF, NMBCA, SWG, USFS
	Monitoring of Nocturnal Species and Raptors Standard protocols are required; look at RMBO owl protocol and Quebec and New Brunswick raptor protocol. Volunteer-based protocols are desired.	Owls, raptors, nighthawks, chimney swifts		SWG, NFWF, NSF, USFWS, CWS, USGS

	Basic Research on High Priority Forest Birds Species include Canada Warbler, Bay-breasted Warbler, Wood Thrush, and Olive-sided Flycatcher; What are the causes of declines of these species? What are the limiting factors? Need basic research and modeling. Examine links to needs in other BCRs.	High priority forest birds	Subcommittee: Ken Rosenberg, Dan Busby, Jim Chase	SWG, NFWF, NSF, USFWS, CWS, USGS
	Monitoring and Research for “wet” forest birds Species include Rusty Blackbird and Olive-sided Flycatcher. Develop better monitoring programs and investigate limiting factors and causes of declines			SWG, USGS
Outreach/ Education/ Policy	Develop Better Mechanisms for Communicating Biological Information Need to develop mechanisms to better communicate information from the science group to those working in policy and landowner stewardship arenas. Policy should be coordinated with more effective information gathering and dissemination.	All birds		
	Enhance Use Of Existing Funding Opportunities Especially need to look at funding for on-the-ground conservation (e.g. Farm Bill, NAWCA) as well as helping to support increased agency funding	All birds		

Agriculture-dominated Landscapes

Project Type	Project description and location	Species affected	Key contacts	Possible funding
Conservation Action	Connecticut River Valley Conservation Easements	Bobolink Meadowlark Savannah Sparrow		Farm Bill, NAWCA, LIP/PSGP

	Regional Airport Land Management / BMPs	Bobolink Meadowlark Savannah Sparrow Grasshopper Sparrow Vesper Sparrow Upland Sandpiper Ring-billed Gull Canada Goose Snow Bunting	Mark LaBarr	SWG, LIP/PSGP
Research	Blueberry Industry Best Management Practices	Vesper Sparrow Upland Sandpiper Wild Turkey		Farm Bill, SWG, NWTF
	Bird Usage and Productivity in Blueberry Lands in Nova Scotia, New Brunswick, and Maine	Vesper Sparrow Savannah Sparrow Upland Sandpiper Whimbrel Wild Turkey American Kestrel Am. Woodcock Gull species		Wildlife Habitat Canada, SWG, NWTF
Monitoring	Region Grassland Bird Data Synthesis/Maintenance	All species	Pam Hunt	State Wildlife Grants
	Monitoring Blueberry Lands in Maritime Provinces	Vesper Sparrow Savannah Sparrow Upland Sandpiper		Wildlife Habitat Canada
Outreach	Back to the Land Initiative (Exurbanite land management practices)	Bobolink Meadowlark Savannah Sparrow		SWG, LIP, PSGP
	Blueberry Industry Best Management Practices Outreach	Vesper Sparrow Upland Sandpiper Wild Turkey Gull species		Wildlife Habitat Canada, SWG, NWTF

On-going or Recently Completed Research and Monitoring Projects in BCR 14

Conservation Plan or Project description (with location)	Responsible Jurisdiction/ Organization	Species addressed	Key contacts (e-mail)	Citation, if published or available on Web, or Completion date
Programme de surveillance des marais (PSM)/ Marsh Monitoring Program (MMP)	Bird Studies Canada/CWS	All marsh bird species	Karl Lévesque Karl.levesque@ec.gc.ca	In progress Internet site to come
Plan conjoint sur le Canard noir (PCCN)/ Black Duck Joint Venture (BDJV): - Monitoring: - Annual helicopter breeding pair survey in boreal forest (8 plots in BCR 14 on the Gaspé peninsula) - Ground breeding pair monitoring along the shore of the St. Lawrence	CWS	Waterfowl (21 species)	Daniel Bordage Daniel.bordage@ec.gc.ca Christine Lepage Christine.lepage@ec.gc.ca	On-going
Plan conjoint des canards de mer (PCCM)/ Sea Duck Joint Venture (SDJV): - Research: - Habitat Use by Common Eider brood in the St. Lawrence - Common Eider Population Dynamic: Female banding - Molting and staging of Harlequin Duck in the Gaspé Peninsula, Québec - Wintering ducks in the Estuary and Gulf of the St. Lawrence, Québec - Monitoring: - Monitoring of Scoters, eiders and mergansers molting sites in the St. Lawrence, Québec - Complete survey of Common Eider wintering in the St. Lawrence Gulf (Québec, Newfoundland, St-Pierre-et- Miquelon) (February 2003)	CWS	Seaduck (Common Eider, Harlequin Duck, Scoters and Mergansers)	Jean-Pierre L. Savard Jean-pierre.savard@ec.gc.ca	On-going
Plan d'action pour la Grande Oie des neiges/ Greater Snow Goose Action Plan - Monitoring: Annual Spring survey along the St. Lawrence	CWS	Greater Snow Goose	Luc Bélanger luc.belanger@ec.gc.ca	Due ?
Plan de gestion pour la Bernache du Canada résidente/ Resident Canada Goose Managing plan - Molting bird survey along the St. Lawrence (July 2003)	CWS	Resident Canada Goose	Jean Rodrigue Jean.rodrigue@ec.gc.ca	In progress Due March 2004

Atlantic Brant Spring survey in the St. Lawrence Estuary (Springs 2002 and 2003)	CWS	Atlantic Brant	Pierre Brousseau Pierre.brousseau@ec.gc.ca	
Plan canadien de gestion pour la Grive de Bicknell/ Bicknell's Thrush Canadian Managing Plan - Research: - Population structure (genetic) - Habitat Selection	CWS	Bicknell's Thrush	Yves Aubry Yves.aubry@ec.gc.ca	In progress Plan Due 2005
Shorebird Monitoring in staging areas - St. Lawrence estuary - Magdalen Islands	CWS	Shorebird	Yves Aubry Yves.aubry@ec.gc.ca	Planned to be around 2004-2006
Species at Risk Program: Monitoring of use of nesting sites by populations of bird species at risk in Québec Recovering Plan for the species below - Barrow's Goldeneye Research - Wintering sites (1999, 2002) - Telemetry - Genetic - Harlequin Duck Research - Breeding sites on the Gaspé Peninsula (1999-2000) - Molting, time budget, site occupation chronology - Piping Plover Monitoring of population on Magdalen Islands (on-going) Banding Program - Horned Grebe Monitoring of population on Magdalen Islands (on-going) Research - Genetic studies - Roseate Tern Monitoring of population on Magdalen Islands (on-going)	CWS/AQGO	Barrow Goldeneye, Harlequin Duck, Piping Plover, Horned Grebe, Roseate Tern	Michel Robert Michel.robert@ec.gc.ca François Shaffer Francois.shaffer@ec.gc.ca	
American Woodcock - Annual Singing-ground survey	CWS	American Woodcock	Jean Rodrigue Jean.rodrigue@ec.gc.ca	
Station de baguage à la RNF baie de L'Isle-Verte/ Baie de L'Isle-Verte NWA Banding Station	CWS	Dabbling Ducks	Jean Rodrigue Jean.rodrigue@ec.gc.ca	

Study of Bicknell's Thrush biology Mt. Gosford, and Gaspé Provincial Park	Canadian Wildlife Service	Bicknell's Thrush	Yves Aubry Yves.aubry@ec.gc.ca	
Chimney Swift Survey	Canadian Wildlife Service	Chimney Swift	Jean Gauthier Jean.gauthier@ec.gc.ca	There is a Status Report in preparation
High Elevation Landbird Monitoring Program – Maritime Provinces <u>target species:</u> Bicknell's Thrush, Winter Wren, Blackpoll Warbler, Swainson's Thrush, White-throated Sparrow	Bird Studies Canada	See project description	Becky Whittam Becky.Whittam@ec.gc.ca	http://www.bsc- eoc.org/regional/atlanpr ograms.html
Atlantic Nocturnal Owl Survey - Mainly set up to monitor Barred Owls on forestry lands but has developed into a full program	Bird Studies Canada	Barred Owl, Great Horned Owl, Saw- whet Owl	Becky Whittam Becky.Whittam@ec.gc.ca	http://www.bsc- eoc.org/regional/atlanpr ograms.html
Cape Breton Beached Bird Survey – surveys for oiled seabirds washed up on beaches	Bird Studies Canada	seabirds	Becky Whittam Becky.Whittam@ec.gc.ca	http://www.bsc- eoc.org/regional/atlanpr ograms.html
Atlantic Bird Observatory Migration Monitoring Station - a member station of the Canadian Migration Monitoring Network	Acadia University	landbird migrants	Dr. Phil Taylor, Acadia University philip.taylor@acadiau.ca	http://landscape.acadia u.ca/abo/
Mountain Bird Watch – monitoring program targeting Bicknell's Thrush, Winter Wren, Blackpoll Warbler, Swainson's Thrush, and White-throated Sparrow in the northeastern U.S. – now coordinated with the High Elevation Monitoring Program in the Maritime Provinces	Vermont Institute of Natural Science	see project description	Dan Lambert dlambert@vinsweb.org	http://www.vinsweb.org/ cbd/mtn_birdwatch.html
Vermont Forest Bird Monitoring Program - tracks long-term population trends of forest interior birds while collecting habitat- specific baseline data across a broad range of forest types	Vermont Institute of Natural Science	forest interior birds	Steve Faccio sfaccio@vinsweb.org	http://www.vinsweb.org/ cbd/FBMP.html

<i>Adirondack Cooperative Loon Program</i> Research on migration timing, routes, stopover and wintering locations; Monitoring impacts of mercury on productivity and conducting annual population census	NY DEC and partners	Common Loon	Nina Schoch <aclp2@juno.com>	First report is available from Nina, second report due in 2004
<i>Wild Turkey Translocation</i> Annual trap and transfer effort of wild turkeys into suitable habitat at the margins of existing range in Maine	MDIFW	Wild Turkey	andy.weik@maine.gov	
<i>Louisiana Waterthrush Surveys and an evaluation of rapid survey methods</i> An examination of the distribution of Louisiana Waterthrush in southern Maine based on point count surveys along streams in York, Cumberland and Oxford Counties. Also, includes discussion of variables affecting detection and suggests methods to rapidly document occurrence.	MDIFW	Louisiana Waterthrush	Tom.hodgman@maine.gov	Hodgman, T.P. and P.U. Wilson. 2002. Louisiana Waterthrush. Pages 85-91 in H. Givens, T.P. Hodgman, and P. deMaynadier, eds. A survey of rare, threatened, and endangered fauna in Maine: Southwest Interior and South Coastal regions (2000-2001). MDIFW, Bangor, ME 04401
<i>Shrubland Bird Surveys</i> An evaluation of the distribution of Blue-winged Warbler in southern Maine following the protocol of Cornell's Golden-winged Warbler atlasing project.	MDIFW	Blue-winged Warbler and other shrubland associated passerines	Tom.hodgman@maine.gov	Hodgman, T.P. and P.U. Wilson. 2002. Blue-winged Warbler. Pages 78-84 in H. Givens, T.P. Hodgman, and P. deMaynadier, eds. A survey of rare, threatened, and endangered fauna in Maine: Southwest Interior and South Coastal regions (2000-2001). MDIFW, Bangor, ME 04401
<i>Grassland Bird surveys</i> A three year evaluation of the most important grassland habitats in Maine for breeding birds. Includes many sites managed for commercial blueberry production in addition to pasture and hayland.	MDIFW in association with Mass. Audubon	Upland Sandpiper, Grasshopper sparrow, Vesper Sparrow, among others	Andy.weik@maine.gov	Weik, A.P. 1999. Conservation of grassland birds in Maine: field survey of breeding birds 1997-1998. Maine Dept of Inland Fisheries and Wildlife, Bangor ME 04401.

<i>Grasshopper Sparrow Census</i> Annual census of Grasshopper Sparrow and other grassland birds at Kennebunk Plains Wildlife Mgt. Area and other occupied sites.	MDIFW, TNC	Upland Sandpiper, Grasshopper sparrow, Vesper Sparrow, among others	T. Parker Schuerman or Charlie.todd@maine.gov	Annual data summary and report prepared by TNC, Southern Maine Office, PO Box 840, Moody, ME 04054 Also: Weik, A.P. 1999. Conservation of grassland birds in Maine: field survey of breeding birds 1997-1998. Maine Dept of Inland Fisheries and Wildlife, Bangor ME 04401. Weik, A.P. and R. Pertell. 2000. Grassland Birds. Pages 116-126 in A.P. Weik, P. deMaynadier, and T.P. Hodgman, eds. A survey of rare, threatened, and endangered fauna in Maine: East Coastal and Eastern Interior regions (1999-2000). MDIFW, Bangor, ME 04401
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Appendix H. List of BCR 14 partner organizations and contact information for individuals participating in the BCR 14 initiative.

BCR 14 Partner Organizations

State/Provincial Wildlife Agencies

Maine Department of Inland Fisheries and Wildlife
Massachusetts Division of Fish and Wildlife
New Brunswick Department of Natural Resources and Energy
New Hampshire Fish and Game Department
New York State Department of Environmental Conservation
Nova Scotia Department of Natural Resources
Prince Edward Island
Societe de la Faune et des Parcs du Quebec
Vermont Fish and Wildlife Department

Federal Agencies

Canadian Wildlife Service
National Park Service - Acadia National Park
Natural Resource Conservation Service
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey

Non-Governmental Organizations/Universities

American Bird Conservancy
Audubon New York
Biodiversity Research Institute
Center for Conservation Biology
Cornell Lab of Ornithology
Ducks Unlimited, Inc.
Ducks Unlimited Canada
International Association of Fish and Wildlife Agencies
Maine Audubon
Massachusetts Audubon
Manomet Center for Conservation Sciences
National Audubon Society
The Nature Conservancy/Nature Conservancy Canada
New England Forestry Foundation
University of New Hampshire
Vermont Institute of Natural Sciences
Wildlife Management Institute

Corporations

Fraser
Huber Resources
International Paper

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