Environment Canada Environnement Canada

Bird Conservation Strategy for Bird Conservation Region 8 and Marine Biogeographic Units 10 and 12 in Newfoundland and Labrador: Boreal Softwood Shield, Newfoundland-Labrador Shelves, and Gulf of St. Lawrence

- Abridged Version -

October 2013



Canada

Preface

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

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

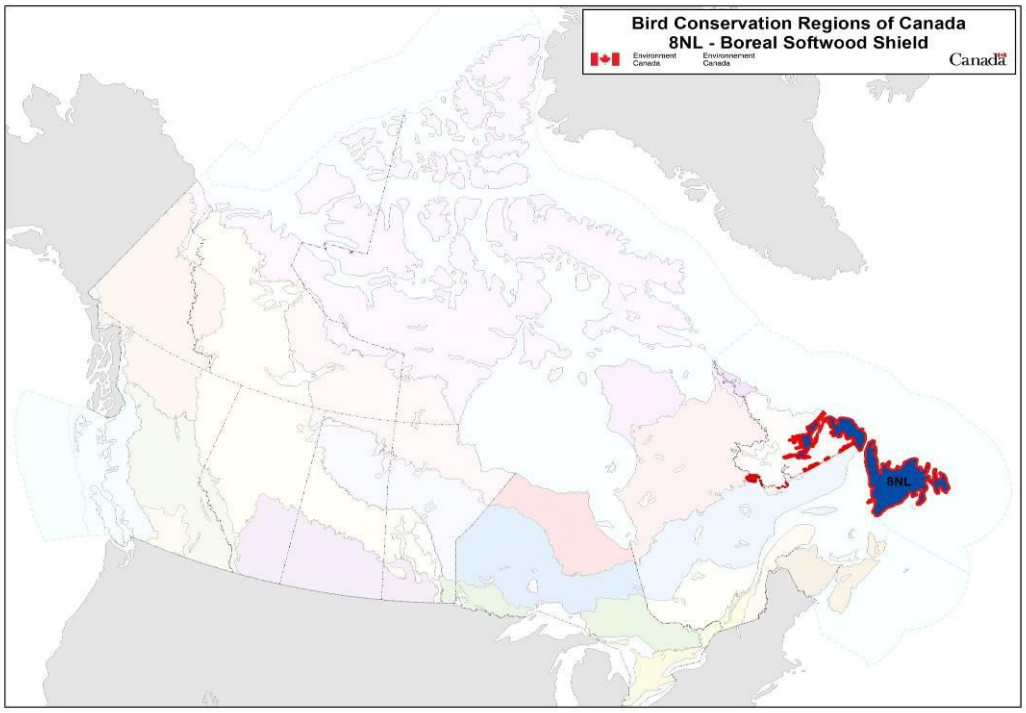
Conservation objectives and recommended actions from the conservation strategies will be used as the biological basis to develop guidelines and beneficial management practices that support compliance with regulations under the *Migratory Birds Convention Act*, *1994*.

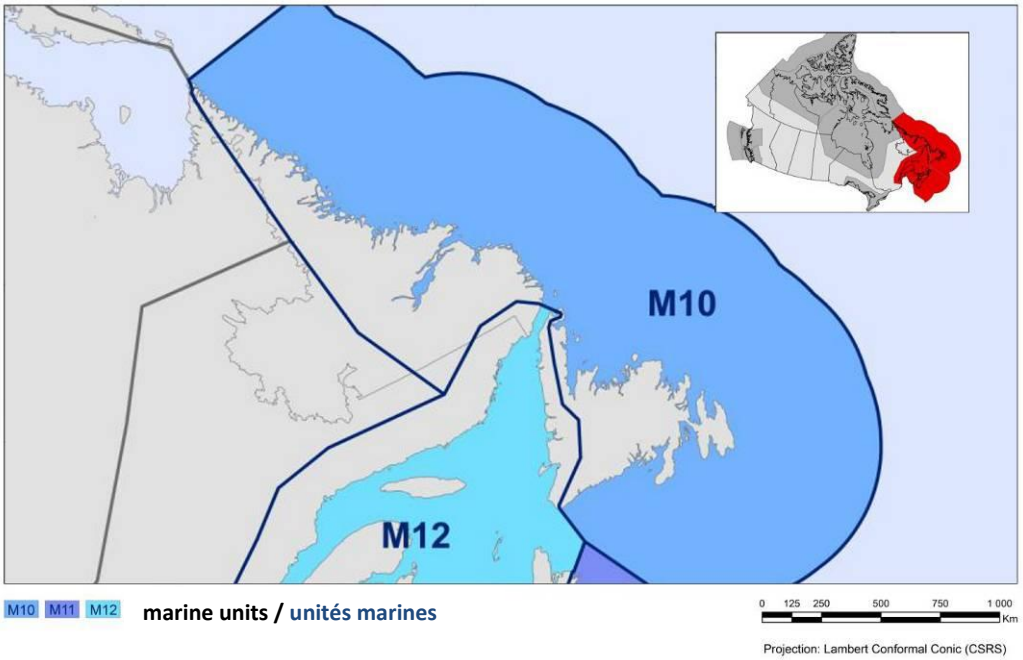
Acknowledgements

This document follows templates developed by Alaine Camfield, Judith Kennedy and Elsie Krebs with the help of the BCR planners in each of the Canadian Wildlife Service regions throughout Canada. However, work of this scope cannot be accomplished without the contribution of other colleagues who provided or validated technical information, commented on earlier draft versions of the strategy and supported the planning process. We would like to extend a sincere thanks to the following people: Karyne Bellehumeur, Doug Bliss, Andrew Boyne, Paul Chamberland, Kevin Davidson, Michael Elliott, Carina Gjerdrum, Alan Hanson, Christie MacDonald, Paul MacDonald, Bryan Martin, Bruce Pollard, Martin Raillard, Isabelle Robichaud, Dane Stuckel, Peter Thomas, Kyle Wellband, Becky Whittam, and other reviewers.

To obtain a copy of the complete version of this strategy, please contact us at migratorybirds_oiseauxmigrateurs@ec.gc.ca.

Bird Conservation Strategy for Bird Conservation Region 8 and Marine Biogeographic Units 10 and 12 in Newfoundland and Labrador: Boreal Softwood Shield, Newfoundland-Labrador Shelves, and Gulf of St. Lawrence





Executive Summary

This strategy pulls together the best available information from the literature on bird conservation in Newfoundland and Labrador. It identifies priority species for conservation, the key threats affecting them and the major conservation actions required to protect them. Its goal is to become a tool for future conservation planning, a one-stop shop where important information on bird conservation is pulled together and displayed. The strategy builds on existing bird conservation strategies and complements those created for the other Bird Conservation Regions (BCR) across Canada. Collectively, these strategies will serve as a framework for implementing bird conservation nationally, and also identify international conservation issues for Canada's priority birds. Strategies are not highly prescriptive, but rather are intended to guide future implementation efforts undertaken by various partners and stakeholders.

This strategy covers three distinct planning units in Newfoundland and Labrador: the terrestrial unit of Bird Conservation Region 8 (BCR 8 NL), as well as two marine biogeographical units, the Newfoundland-Labrador Shelves (MBU 10 NL) and the Gulf of St. Lawrence (MBU 12 NL).

BCR 8 NL is comprised of the entire island of Newfoundland and 16% of the southeastern part of Labrador. This portion of the BCR 8, the Boreal Softwood Shield, is covered by a combination of coniferous forests and transitional or mixed wood forests, with wetlands, barrens, rock outcrops, waterbodies and coastal landforms also prevalent. The human population of BCR 8 NL is sparse and concentrated on the Avalon Peninsula of Newfoundland. There are 37 priority bird species in BCR 8 NL. These species are primarily associated with wetland, coniferous forest, coastal (above high tide) and riparian habitats.

The Newfoundland-Labrador Shelves (MBU 10 NL) encompass one of the largest areas of continental shelf in the world ranging from the northern tip of Labrador south to the Grand Banks off the island of Newfoundland. This diverse marine unit has significant oil and gas activity, a rich fishery, and extensive commercial traffic, all of which have the potential to affect birds using the area. There are 39 priority species found in the coastal and marine habitats of MBU 10 NL.

The Gulf of St. Lawrence (MBU 12 NL) represents one of the largest and most productive estuarine/marine ecosystems in Canada. Its large spatial and temporal variations in environmental conditions and oceanographic processes provide for a highly diverse and productive biological community. There is currently no oil or gas activity in this marine unit, but there is a fishery concentrated on the west coast of Newfoundland. Some marine transportation occurs around larger population centres. There are 29 priority species associated with the coastal and marine habitats of MBU 12 NL.

There is a variety of current and potential threats to the region's avifauna. The most prevalent threats in all planning units are chemical contamination from heavy metals, oil spills and/or discharges; gaps in knowledge of the distribution, abundance and population trends of priority

bird species; competition for resources between bird species and aquaculture or commercial fisheries; entanglement in fishing gear; and climate change.

The most frequently identified conservation objective in BCR 8 NL is ensuring the availability of adequate habitat for priority bird species, while in MBU 10 NL and MBU 12 NL the main objectives are reducing mortality or increasing productivity. However, in all planning units improving our understanding of priority bird species was a frequently identified conservation objective. A combination of beneficial management practices (for example, to manage shipping activities and minimize accidental oil discharges), site management or protection (such as limiting industrial activities within buffer zones around key sites), public education as to the impacts of disturbance from recreational and commercial activities, changes in legislation (for example, regulating the use of fishing gear that reduces bycatch) could help alleviate many of the threats identified in these three units.

We hope that the information in this strategy will become a useful tool for future conservation planning, especially in terms of habitat conservation, as it presents relevant information on priority species, threats and conservation actions in a summary format.

Introduction: Bird Conservation Strategies

Context

This document is one of a suite of Bird Conservation Region strategies (BCR strategies) that have been drafted by Environment Canada for all regions of Canada. These strategies respond to Environment Canada's need for integrated and clearly articulated bird conservation priorities to support the implementation of Canada's migratory birds program, both domestically and internationally. This suite of strategies builds on existing conservation plans for the four "bird groups" (waterfowl,[1] waterbirds,[2] shorebirds[3] and landbirds[4]) in most regions of Canada, as well as on national and continental plans, and includes birds under provincial/territorial jurisdiction. These new strategies also establish standard conservation planning methods across Canada, and fill gaps, as previous regional plans do not cover all areas of Canada or all bird groups.

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

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

[1] NAWMP Committee 2004.
[2] Milko et al. 2003.
[3] Donaldson et al. 2000.
[4] Rich et al. 2004.

Strategy Structure

This strategy includes three distinct Canadian planning units: Bird Conservation Region 8 in Newfoundland and Labrador (BCR 8 NL), as well as Marine Biogeographic Units 10 and 12 surrounding the provincial coasts (MBU 10 NL and MBU 12 NL). These units have distinct lists of priority bird species. The MBUs have only two habitat classes based on the Land Cover Classification System: waterbodies, snow and ice, and coastal. To distinguish them from the equivalent habitat classes in BCR 8 NL, they are referred to as marine waters and coastal (intertidal) in the MBUs, and as inland waterbodies and coastal (above high tide) in BCR 8 NL.

While the French islands of St. Pierre and Miquelon occur in MBU 10 NL, threats to priority birds in the French Exclusive Economic Zone are only covered in the full strategy under Section 3: Threats Outside Canada. None of the conservation actions that address threats to priority birds of MBU 10 NL are proposed for French territory or France's Exclusive Economic Zone. All maps presented in this strategy should also be understood to exclude French territory and the French Exclusive Economic Zone.

Section 1 of this strategy, published here, presents general information about the BCR/MBUs and the subregion, with an overview of the six elements[5] that provide a summary of the state of bird conservation at the subregional level. Section 2, included in the full version of this strategy, provides more detail on the threats, objectives and actions for priority species grouped by each of the broad habitat types in the subregion. Section 3, also included in the full version, presents additional widespread conservation issues that are not specific to a particular habitat or were not captured by the threat assessment for individual species, as well as research and monitoring needs, and threats to migratory birds while they are outside of Canada. The approach and methodology are summarized in the appendices of the full strategy, but details are available in a separate document (Kennedy et al. 2012). A national database houses all the underlying information summarized in this strategy and is available from Environment Canada.

[5] The six elements are: Element 1 – Priority Species Assessment; Element 2 – Habitats Important to Priority Species; Element 3 – Population Objectives; Element 4 – Threat Assessment for Priority Species; Element 5 – Conservation Objectives; Element 6 – Recommended Actions.

Characteristics of Bird Conservation Region 8: Boreal Softwood Shield in Newfoundland and Labrador

The entire Bird Conservation Region 8 (Boreal Softwood Shield) is a broad, U-shaped region that covers approximately 1 800 000 km^2 and extends from northeast Alberta, northern Saskatchewan, sections of Manitoba, Ontario and Quebec, eastern Labrador and all of Newfoundland (Environment Canada 2000; 2011). The region is mostly comprised of seacoasts in the east and vast areas of closed coniferous forests in the north, whereas broad-leaved deciduous trees and pines are more widely distributed in the southern portions. BCR 8 is also a mosaic of boreal uplands, wetlands and peatlands interspersed by several small to medium-sized lakes (North American Bird Conservation Initiative 2013).

The Atlantic sub-region of BCR 8 extends into two geographical divisions as the Strait of Belle Isle separates the island of Newfoundland from mainland Labrador (Fig. 1). The island of Newfoundland (111 390 km^2) is entirely contained within BCR 8 NL, while only 16% of Labrador (47 000 km^2), mostly in the eastern region plus the areas surrounding Lake Melville and Paradise River, is included. The combined area of these two portions is 158 390 km^2. This region is characterized by a unique geological landscape strongly influenced by glacial erosion and the collision of tectonic plates (Environment Canada 2000). The Long Range Mountains on Newfoundland's west coast are the northeastern-most extension of the Appalachian mountain system in North America while Labrador is the eastern-most part of the Canadian Shield comprised of ancient bedrock (Encyclopedia Britannica Online 2013).

BCR 8 NL reflects the combination of coniferous forests, transitional or mixed wood forests, wetlands, barrens, rock outcrops, waterbodies and coastal landforms contained within the Boreal Softwood Shield (Fig. 1), which is atypical of the general landscape. The majority of the province is forested, and the principal species are conifers, of which balsam fir (*Abies balsamea)* and black spruce *(Picea mariana*) are the most abundant. In most parts of the province, but particularly on the island, conifers are mixed with deciduous species such as white (*Betula papyrifera*) and yellow birch (*Betula alleghaniensis*) and a wide variety of hardwood shrubs (NL Department of Natural Resources 2012a). The tallest and healthiest stands of forest occur in sheltered areas of deep and well-drained soils, while in other areas much of the forest growth is inhibited as a result of high wind exposure, water-logged soil, temperature limitations and poor soil conditions (NL Department of Natural Resources 2012b). In other areas within BCR 8 NL, repeated fires and subsequent erosion have created barrens that provide habitat for a great variety of small woody plants (NL Department of Natural Resources 2012a).

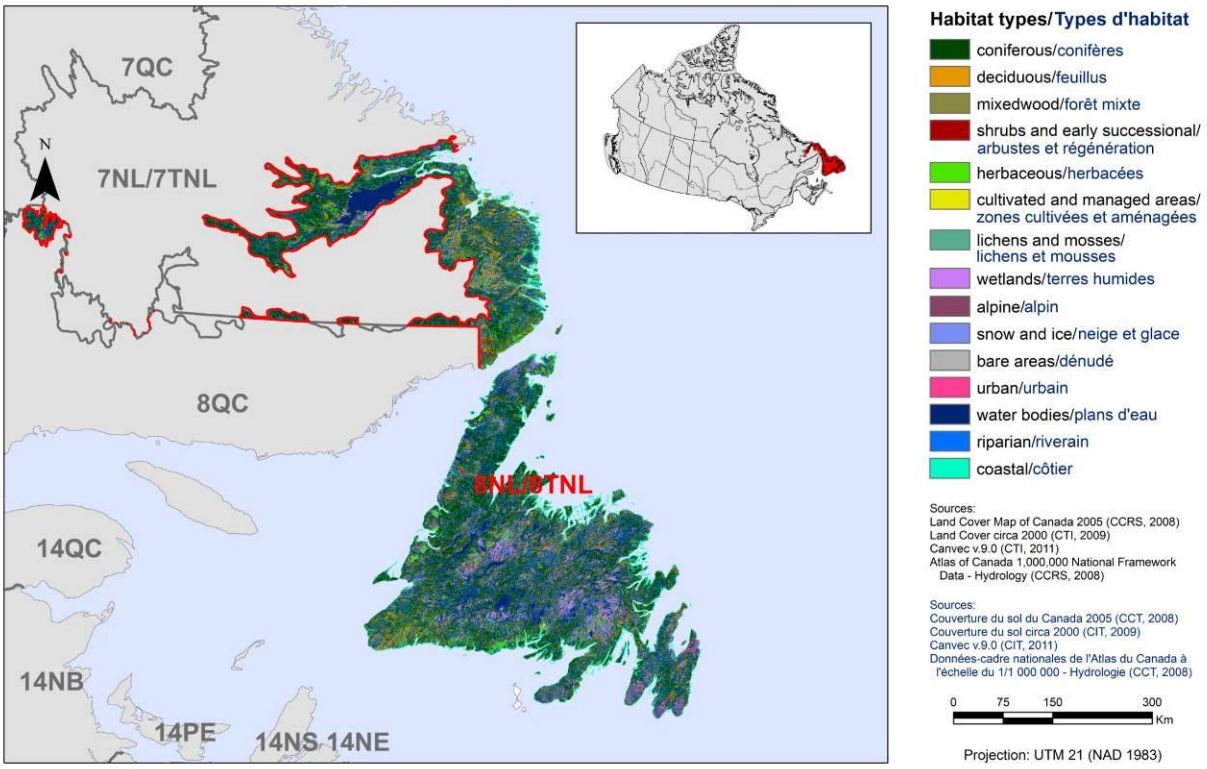


Figure 1. Land cover in BCR 8 NL.
The red line delineates the geographic boundaries established by the North American Bird Conservation Initiative for the BCRs. In this document, the boundaries of BCR 8 NL do not extend below the high-tide line.

The population of Newfoundland and Labrador is estimated at 512 659, of which approximately 94% reside on the island of Newfoundland, with the remainder located in Labrador (NL Statistics Agency 2013). The Avalon Peninsula on the southeastern coast of Newfoundland is the most densely populated part of the island and contains the capital and largest city of the province, St. John's, where resides almost 40% of the province's population (NL Statistics Agency 2013). Other adjacent cities are Mount Pearl, a number of smaller towns such as Conception Bay South, Harbour Grace, Carbonear, Trepassey and Placentia, as well as a host of small villages typically located at the edge of the sea (Encyclopedia Britannica Online 2013). In the Labrador portion of BCR 8 NL, the largest urban area is the town of Happy Valley-Goose Bay with a population of 7 552 (Statistics Canada 2013).

The climate in Newfoundland and Labrador is varied because of the north-south extent of the province, prevalent westerly winds, cold ocean currents, and local factors such as mountains and coastlines. The island of Newfoundland in general has a humid continental climate greatly influenced by the sea with long, cold winters, short, warm summers and abundant precipitation (Stantec 2010). Southern Labrador has a subarctic climate characterized by short, cool summers and long, cold winters; precipitation is low to moderate (Stantec 2010). The BCR 8 NL region is known for having the strongest winds of all the Canadian provinces while some areas around the island of Newfoundland and along the coast of Labrador are recognized for the occurrence

of dense fog due to the contrast between sea and air temperatures (Encyclopedia Britannica Online 2013).

The economy of Newfoundland and Labrador is substantially dependent on the exploitation of natural resources. In 2011, the provincial gross domestic product (GDP) of all industries was calculated at over $31.5 billion (NL Department of Finance 2012). Service industries accounted for roughly $14.1 billion, while resource-based industries such as mining, construction, oil extraction and support activities, utilities, fishing, hunting and trapping, agriculture, forestry and logging (e.g., sawmills, paper mills), and manufacturing (e.g., seafood processing, paper manufacture, oil refining, production of food/beverages or brewing and footwear) accounted for the remaining $17.4 billion (NL Department of Finance 2012). Tourism is also an important part of the services-producing sector and is of growing value to the economy. In 2010, nearly 518 500 non-resident tourists visited Newfoundland and Labrador, spending an estimated $410.6 million (NL Department of Finance 2011).

Mining is one of the largest and oldest industries in the province and a major contributor to the economy accounting for 10.4% or $3.3 billion of the GDP in 2011 (NL Department of Finance 2012). In BCR 8 NL, a number of mines and quarries on the island of Newfoundland produce copper, zinc, silver, gold, silica, barite, dolomite, gypsum, dimension stone, sand, gravel and peat. The major metal operations are Duck Pond and Beaver Brook in central Newfoundland, as well as Pine Cove and Ming Mine, both located in the Baie Verte Peninsula region. The non-metal operations are Burgoynes Cove near Clarenceville, Bishops Falls in central Newfoundland, Lower Cove on the Port au Port Peninsula in western Newfoundland, and Coal Brook also on the western coast. There is also a Long Harbour nickel processing plant, Nugget Pond milling facility and a series of other exploration properties on the island (NL Department of Natural Resources 2012c). In Labrador, there are no metal or non-metal operations; however, there are major rare earth, copper and ironsand exploration properties in BCR 8 NL such as Search Minerals in Port Hope Simpson, Silver Spruce Resources in Pope's Hill, Wolverine Exploration in Cache River and Grand River Ironsands in Churchill River (NL Department of Natural Resources 2012c).

Construction is also an important industry for the provincial economy as it contributed nearly $1.9 billion to the GDP in 2011 (NL Department of Finance 2012). Most of the construction was related to non-residential expenditures associated with the Long Harbour nickel processing facility, Hebron offshore oil project, as well as public sector investments such as the Trans-Labrador Highway, new student residences at Memorial University and new long-term care facilities (NL Department of Finance 2012).

The forestry and logging industry's estimated value for 2011 is $133.5 million in terms of provincial GDP, which is noticeably small (0.4%) considering the very large area of forested and wooded lands in Newfoundland and Labrador (NL Department of Finance 2012). In BCR 8 NL, the commercial forestry industry is limited to the island of Newfoundland where only a very small percentage of forest land is available for harvesting because the cool, moist climate slows nutrient cycling and produces few highly productive forests (Vasarhelyi and Kirk 2007). The major components of the commercial forestry industry are the production of newsprint from

a paper mill in Corner Brook, as well as a significant amount of domestic fuel wood (i.e., firewood) and to a lesser extent value-added wood products (e.g., cabinet doors, flooring) produced by large sawmills on the island (NL Department of Finance 2012; NL Department of Natural Resources 2013a).

The extent of land available for agriculture in Newfoundland and Labrador is very small, roughly 400 km^2, and only a fraction is used for crops because of acid soils, cool temperatures and short-growing seasons (NL Department of Natural Resources 2013b). In 2011, the agriculture sector's estimated value was $76.5 million but only accounted for 0.2% of the total provincial GDP (NL Department of Finance 2012). Agricultural lands in BCR 8 NL are limited to areas south of St. John's, near Deer Lake and in the Codroy Valley on the island of Newfoundland, as well as some marginal farm land areas in central Labrador. The main food crops produced for local consumption are potatoes, rutabagas, turnips, carrots and cabbage. Also, more than 75% of agricultural income originates from sales of poultry, dairy products and eggs. Wild blueberries, partridgeberries (lingonberries) and bakeapples (cloudberries) are harvested commercially and used in jams and wine making (NL Department of Natural Resources 2013b)**.**

The only Aboriginal peoples remaining on the island of Newfoundland at present are identified as Mi'kmaq. The indigenous Beothuk were also residing on the island at the time of European contact in the 15th and 16th centuries; however, they disappeared in 1829 (Pastore, 1997a). The Mi'kmaq people reside primarily on a reserve at Conne River (Miawpukek First Nation), but there are also various concentrations elsewhere in central and western Newfoundland known as Qalipu First Nations (Pastore 1997b). Anteriorly, the Mi'kmaq were semi-nomadic and harvested wildlife available to them such as seafood, big or small mammals, fish, seabirds and eggs (Pastore 1997b). The current traditions of these people have changed and evolved over time, largely as a result of French and British colonization of Canada (McMillan 1995). The Aboriginal peoples of Labrador include the Northern Inuit of Nunatsiavut, the Southern Inuit-Métis of NunatuKavut, and the Innu (Aboriginal Affairs and Northern Development Canada 2009)**.** The Inuit of Labrador are found in several regions on the north coast (i.e., Rigolet, Makkovik, Postville, both administrative capitals of Hopedale and Nain) and are direct descendants of the prehistoric Thule: hunters who spread from Alaska across the circumpolar regions of Canada and Greenland. In 2005, the Nunatsiavut Government was established as a regional government within the province of Newfoundland and Labrador (Nunatsiavut Government 2009). The Labrador Inuit-Metis are found in a number of communities on the central and southern coasts of Labrador (i.e., Happy Valley Goose Bay, Mud Lake, North West River, Cartwright, Paradise River, Black Tickle, Norman Bay, Charlottetown, Pinsent's Arm, Williams Harbour, Port Hope Simpson, St. Lewis, Mary's Harbour and Lodge Bay), where a significant part of the population are derived from European white-Inuit intermarriage (NunatuKavut 2012). Nowadays, Inuit-Metis traditional fishing, hunting and trapping methods still resonate with a number of community members (Pastore, 1997c). The Labrador Innu peoples occupy two settlements: Sheshatshiu, near Lake Melville, and Natuashish, along the northern coast, plus many have retained their original languages and a portion of their nomadic ancient cultures (Innu Nation 2013).

There is a variety of current and potential threats to the region's avifauna. The most prevalent are related to gaps in knowledge on the distribution, abundance and population trends of priority species and the effects of climate change including habitat degradation and change, changes to food webs, and increases in the frequency of storms causing mortality and affecting habitat quality.

On the island of Newfoundland, nearly 8% (terrestrial: 8 888 km^2, marine: 3 km^2) of the surface area is protected either as provincially or federally administered areas, while nearly 3.5% of the surface area is protected in Labrador (terrestrial: 9 893 km^2, marine: 83 km^2; Canadian Council on Ecological Areas 2011; Fig. 2). Though there are no Migratory Bird Sanctuaries in Labrador, Environment Canada manages three Migratory Bird Sanctuaries on the island of Newfoundland for a total land area of approximately 10 km^2: Île aux Canes (1.50 km^2) and Shepherd Island (0.135 km^2); both provide nesting habitat for Common Eiders, while Terra Nova (8.70 km^2) acts as a hunting exclusion zone around Terra Nova National Park. There are no National Wildlife Areas in Newfoundland or Labrador. Parks Canada Agency manages two National Parks on the island of Newfoundland: Gros Morne and Terra Nova, for a total terrestrial area of 2 205 km^2. Gros Morne National Park is also a UNESCO World Heritage Site. In addition, there are seven national historic sites (Signal Hill, Cape Spear, Castle Hill, Hawthorne Cottage, L'Anse aux Meadows, Port au Choix, Ryan Premises), all on the island of Newfoundland and one (Red Bay) in Labrador (Historic Sites Association of Newfoundland and Labrador 2013). There is also a series of ecological reserves in BCR 8 NL including the Avalon and Bay du Nord Wilderness Reserves, and the Little Grand Lake Provisional Ecological Reserve (NL Department of Environment and Conservation 2013a).

The total area of Newfoundland and Labrador is 405 720 km^2, of which 94% is owned by the Provincial Crown. As such, the majority of protected areas (in both number and total surface area) are provincially managed: 53 terrestrial areas (6 670 km^2) on the island of Newfoundland and three terrestrial (193 km^2) plus one marine (24 km^2) area in Labrador. In addition to these protected areas, there are a number of environmental non-governmental organizations engaged in securing and managing lands for conservation. The major organizations involved in these activities on the island of Newfoundland are:

- Ducks Unlimited Canada (43 projects totaling 33 km^2 of waterfowl habitat)
- Nature Conservancy Canada (owns 37 properties and easements on 27 km^2)

In Labrador, Nature Conservancy Canada is working on a habitat conservation plan with communities, environmental non-governmental organizations, universities, the Nunatsiavut (including the Innu Nation and NunatuKavut Community Council), and federal and provincial governments. In addition, designations that recognize ecological uniqueness (but do not formally protect habitat) have elevated public awareness and promoted the conservation of ecologically significant habitats. In BCR 8 NL these include:

- Grand Codroy Estuary on the island of Newfoundland recognized under the Ramsar Convention on Wetlands of International Importance (9 km^2)
- 25 Important Bird Areas (9 720 km^2) on the island of Newfoundland
- 10 Important Bird Areas (2 073 km^2) in Labrador

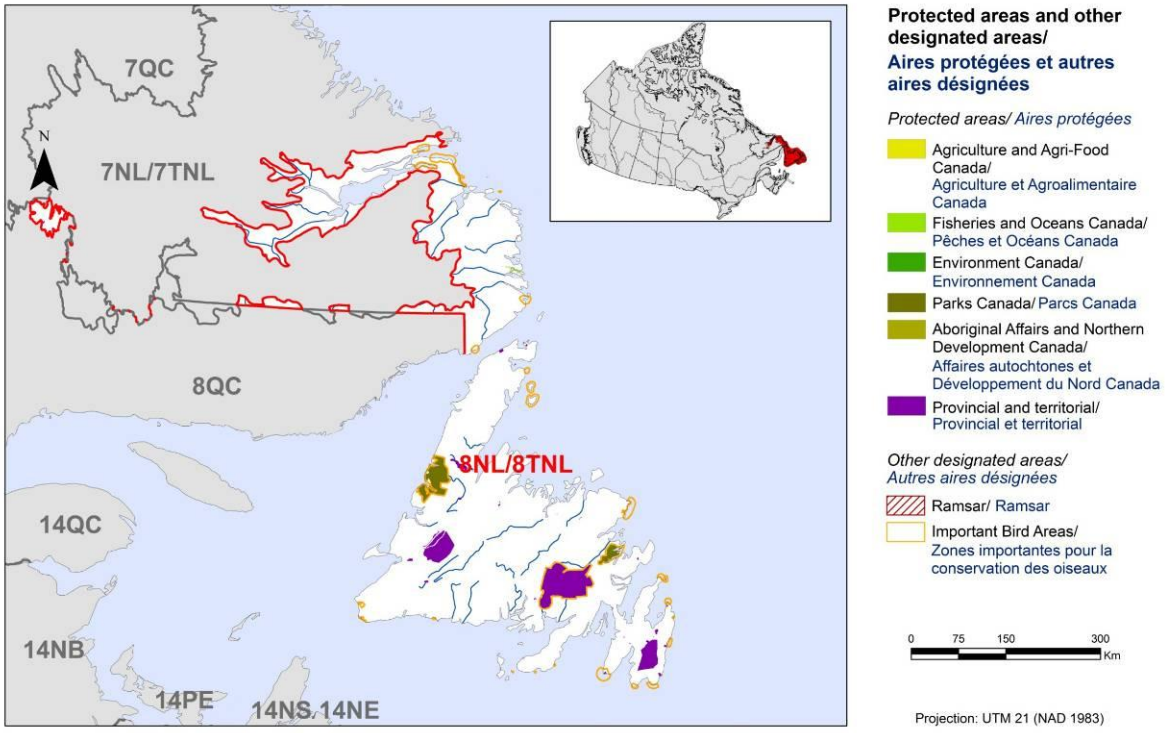


Figure 2. Map of protected and designated areas in BCR 8 NL.

Characteristics of Marine Biogeographic Unit 10: Newfoundland-Labrador Shelves

The Newfoundland-Labrador Shelves (corresponding to M10 in Fig. 3) extend off the eastern coast of Canada into the Atlantic Ocean and encompass one of the largest areas of continental shelf in the world (Department of Fisheries and Oceans 2010). Ranging from the northern tip of Labrador south to the Grand Banks off the island of Newfoundland, and bounded by the Canadian Exclusive Economic Zone, the total area of MBU 10 NL is greater than 2.5 million km^2 (Department of Fisheries and Oceans 2010). The Newfoundland-Labrador Shelves exhibit significant variation in seabed structure and are represented by extensive coastal forms, offshore banks, slopes and canyons (Department of Fisheries and Oceans 2010). The coastlines are continually modified by exposure to wave action, sea ice and fluctuating sea levels, with various elevation ranges from areas of low relief to steep cliffs, and consistent tidal ranges from 0.8 to 1.6 m (Templeman 2010). The continental shelf region is typically divided into three zones: (1) an inner shelf, a narrow zone parallel with the coast up to 20 km wide; (2) an inner-central shelf, consisting of a broad, fairly flat area, averaging 50 – 150 km in width, and ranging from 50 – 200m in depth; and (3) an outer shelf. The continental slope region lies beyond this continental shelf break, rapidly reaching depths over 3 000 m (Templeman 2010).

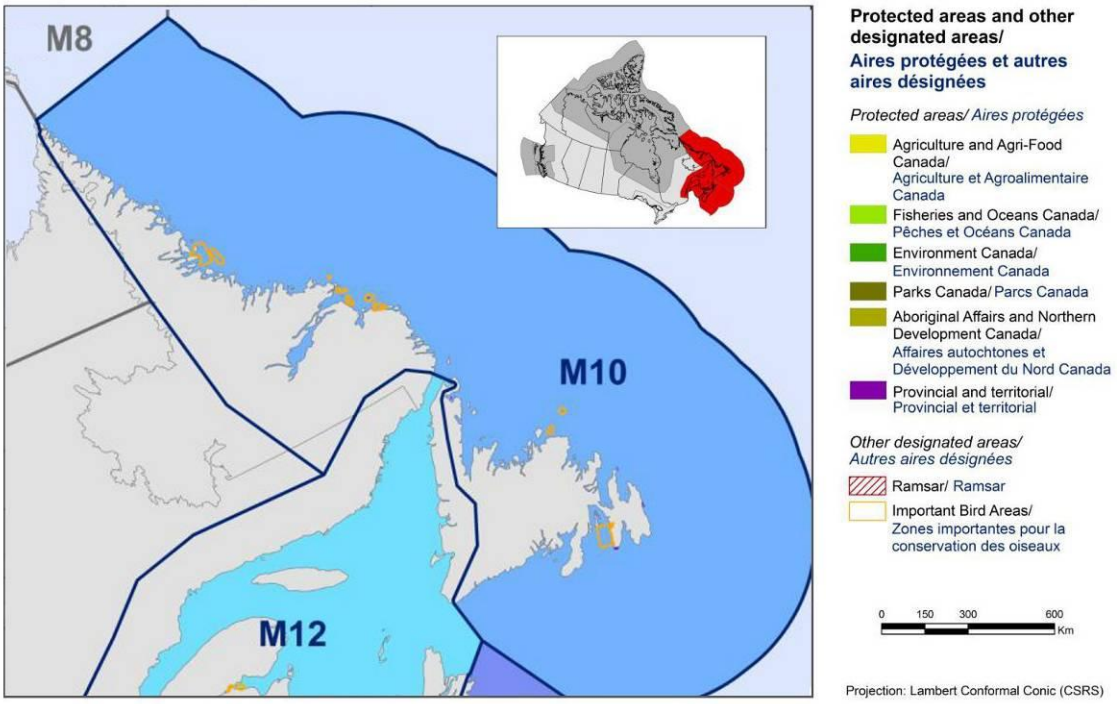


Figure 3. Map of marine protected areas and other designated areas in MBU 10 NL (M10) and MBU 12 NL (M12).

The waters off the Newfoundland-Labrador Shelves are mainly influenced by the Labrador Current that flows southward into inshore and offshore branches. The offshore branch originates from the West Greenland Current and borders the continental shelf plus the Grand

Banks. It also transports 10 times more water than the inshore branch, in addition to being saltier and warmer (Rose 2007). The colder, fresher inshore branch originates from the Canadian high Arctic, receives freshwater input from rivers along its route, and hugs the northeast coast of Newfoundland and Labrador with the Avalon Channel, and turns west along the south coast of the island, penetrating Placentia Bay before entering the Gulf of St. Lawrence (Rose 2007). A small area of MBU 10 NL is covered in sea ice 7 to 10 months of the year. Icebergs are abundant and occur year-round. Most of these icebergs are produced by glaciers on the Greenland coast that are detached and transported northward in a counter-clockwise direction around Baffin Bay then southward through the Davis Strait by the Labrador Current (Templeman 2010). The mixing of the Labrador Current with the warmer Gulf Stream along with the shape of the ocean floor in MBU 10 NL lifts nutrients to the surface, making these waters some of the most productive in the world (Department of Fisheries and Oceans 2010). The Newfoundland-Labrador Shelves support an impressive diversity of marine life given their temperate nature, including various species of cold-water corals, plankton, fish, mammals, amphibians and seabirds. In addition to the effects on nutrients, the mixing of the cold and warm currents often causes frequent and dense fog in the area, which is most common over the Grand Banks and along the southern and southeastern coasts of Newfoundland (Encyclopedia Britannica Online 2013). The marine waters of the Newfoundland-Labrador Shelves are also among the stormiest regions in North America (Templeman 2010).

In MBU 10 NL, extensive offshore oil and gas exploration/extraction is proceeding in the Grand Banks region, and this industry accounted for approximately 33% ($10.35 billion) of the provincial GDP in 2011 (NL Department of Finance 2012). The province currently has three major oil fields: Hibernia, Terra Nova and White Rose. The Hebron field will be Newfoundland and Labrador's fourth stand-alone offshore oil project; development activities have been ongoing since 2008, and the first oil is expected in 2017 (NL Department of Finance 2012; NL Department of Natural Resources 2013c).

Grand Banks is also one of the richest fishing grounds in the world; therefore the fishing industry, a combination of harvests of fish (cod, haddock, halibut and herring) and shellfish (crab, shrimp and clams; NL Department of Natural Resources 2013d), remains an important part of the provincial economy. This industry contributes over $215 million to the GDP annually when combined with hunting and trapping (NL Department of Finance 2012). Aquaculture is also an important industry to the province, and all sites within MBU 10 NL are situated around the island of Newfoundland and very near the coastline, with the largest concentration located in the Bay d'Espoir region (Templeman 2010). This industry is focusing development efforts on Steelhead Trout, Atlantic Salmon, blue mussels and Atlantic Cod. Other species such as scallops and Arctic Char are also being investigated for development potential (Department of Fisheries and Oceans 2011**;** Newfoundland Aquaculture Industry Association 2011).

Marine transportation is an important component of the economy as the major industries in MBU 10 NL are ocean-based (i.e., fisheries, oil and gas exploration). The strategic location of this region on the Great Circle Route between eastern North America and Europe is important for domestic and international shipping, while the Cabot Strait links trans-Atlantic shipping

routes to the St. Lawrence Seaway and the Great Lakes (Templeman 2010). On the island of Newfoundland, the major port that handles very large volumes of cargo (used mainly for the movement of oil) is Come By Chance in Placentia Bay. Other ports include Whiffen Head, Hibernia and Holyrood (Templeman 2010)**.** The port of St. John's is also a major commercial port for shipments of consumer and industrial goods, while in Labrador, Happy Valley-Goose Bay is the central hub (Transport Canada 2012). In addition to large cargo vessels, the marine transportation sector includes ferries, tugs/barges, recreational boating and cruise ship traffic. Several smaller ferries connect numerous other coastal towns and offshore island communities around the island of Newfoundland and up the Labrador coast. Inter-provincial ferry services operate auto-passenger ferries from North Sydney (N.S.) to the towns of Port aux Basques and Argentia on the southern coast of the island of Newfoundland (NL Department of Transportation and Works 2012). Tug, barge activities and recreational boating are also common and tend to be restricted to coastal, inland and harbour waters (Cruiseship Authority of Newfoundland and Labrador 2013).

There is a variety of existing and potential threats to the region's avifauna. Oil pollution is an increasing threat to priority species in the region as the industry's exploitation of reserves increases. Also, gaps in knowledge on the distribution, abundance and population trends of priority species makes it difficult to assess their status or understand the causes of population decline.

MBU 10 NL contains two important Marine Protected Areas representing 0.44% of the total area (Fig. 3). The Department of Fisheries and Oceans is responsible for the Eastport Marine Protected Area (3 km^2) in Bonavista Bay on the island of Newfoundland. In addition, the Laurentian Channel between the provinces of Nova Scotia and Newfoundland and Labrador is currently considered as a potential future Marine Protected Area (Department of Fisheries and Oceans 2012). There is one important Marine Protected Areas in Labrador: Gilbert Bay Marine Protected Area (59 km^2) managed by the Department of Fisheries and Oceans. There are also numerous ecological reserves in MBU 10 NL including the Gannet Islands Ecological Reserve (24 km^2), which is managed provincially and protects the largest and most diverse seabird colonies in North America (e.g., Razorbills, Atlantic Puffins, Common and Thick-billed Murres, Black-legged Kittiwakes, Great Black-backed Gulls, and Northern Fulmars). Other important seabird ecological reserves in MBU 10 NL include Baccalieu Island, Cape St-Mary's, Funk Island, Witless Bay, Hare Bay Islands and Lawn Islands Archipelago Provisional (NL Department of Environment and Conservation 2013a).

Characteristics of Marine Biogeographic Unit 12: Gulf of St. Lawrence

The Estuary and Gulf of St. Lawrence (corresponding to M12 in Fig. 3) represent one of the largest and most productive estuarine/marine ecosystems in Canada, and in the world, with a total area of approximately 247 000 km^2 (Therriault 1991). With a drainage basin that includes the Great Lakes, the St. Lawrence marine ecosystem receives more than half of the freshwater inputs from the Atlantic Coast of North America (Department of Fisheries and Oceans 2010). This ecosystem is also strongly influenced by ocean and climate variability in the North Atlantic, of both Arctic (Labrador Current) and tropical (Gulf Stream) origin. As a result, this area exhibits large spatial and temporal variations in environmental conditions and oceanographic processes (Benoît et al. 2012). This unique setting provides the conditions for a highly diverse and productive biological community and trophic structure (Benoît et al. 2012).

MBU 12 is situated downstream of some of the largest urban and industrial centres in Canada, areas of pronounced development on the continent and emitters of industrial and agricultural-based contaminants (Benoît et al. 2012). The massive influx of fresh water, especially during springtime and summer wet seasons, lowers salinity levels in the Gulf and Estuary. Increasing commercial, ecotouristic and recreational navigation are vectors for the propagation of aquatic invasive species (Benoît et al. 2012). Shoreline development and associated nutrient and sediment loading as well as a large and expanding shellfish aquaculture industry have transformed large portions of the coast, the estuarine and lagoon waters into farms (Benoît et al. 2012). Benoît and colleagues (2012) reviewed evidence that suggested important aspects of the food-web in MBU 12 changed in the early 1990s. Also, increasing average sea surface temperature and hypoxia, partly as a result of climate change and coastal zone deterioration related to anthropogenic pressures (e.g., coastal eutrophication), may be causing physiological stress in marine organisms (Benoît et al. 2012).

The Newfoundland and Labrador portion of MBU 12 encompasses an area of approximately 21 400 km^2 off the western coast of the island of Newfoundland (Fig. 3). The Newfoundland Shelf waters enter the gulf on the eastern side of the Cabot Strait, then drift northeast along the west coast of Newfoundland and, coupled with a westerly drift along the north shore, complete a large counter-clockwise gyre in the surface circulation (Alexander et al. 2010). Deep inflow of Atlantic water through the Cabot Strait compensates for the net outflow of surface waters. Winter cooling and contributions from the Labrador Shelf via Belle Isle Strait result in significant ice cover (and associated navigational hazards) in the gulf for at least 3 months each winter (Alexander et al. 2010).

There is currently no oil and gas exploitation in the MBU 12 NL region of the Gulf of St. Lawrence; however, a number of exploration companies currently hold onshore/offshore interests along western Newfoundland. In addition, the fishing industry in MBU 12 NL is focused mainly on the west coast of the island of Newfoundland and the northern Gulf of St. Lawrence for species such cod, mackerel, herring, capelin and shrimp (Alexander et al. 2010). Aquaculture activity is limited to 17 sites from Robinsons on the southwest coast to Pistolet Bay on the Northern Peninsula (Alexander et al. 2010). Shellfish operations (e.g., oysters, blue mussels) are the major contributors, but there are also a few seasonal sites for Atlantic Cod and many

established salmonid farms distributed along western Newfoundland (Department of Fisheries and Oceans 2010).

The major shipping port in MBU 12 NL is located in Corner Brook on the island of Newfoundland, while the shipping of newsprint occurs from Port Harmon in Stephenville (Transport Canada 2012). Ferry services are used as other forms of marine transport, such as a regular passenger and car ferry service across the Strait of Belle Isle connecting the province's island of Newfoundland with the region of Labrador on the mainland. Another ferry travels from St. Barbe, on the Great Northern Peninsula of Newfoundland, to the port town of Blanc-Sablon (Que.), located on the provincial border and beside the town of L'Anse-au-Clair in Labrador (NL Department of Transportation and Works 2012).

There is a variety of existing and potential threats to the region’s avifauna. Oil pollution is an increasing threat to priority species in the region as the industry’s exploitation of reserves increases. Also, gaps in knowledge on the distribution, abundance and population trends of priority species makes it difficult to assess their status or understand the causes of population decline.

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

Element 1: Priority Species Assessment

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

The purpose of the prioritization exercise is to focus implementation efforts on the issues of greatest significance for Canadian avifauna. Table 1 provides a full list of all priority species and their reason for inclusion in BCR 8 NL, MBU 10 NL and MBU 12 NL. Tables 2 and 3 summarize the number of priority species in BCR 8 NL, MBU 10 NL and MBU 12 NL by bird group and by the reason for priority status.

In BCR 8 NL, there are 37 priority species (Table 2); most of which are landbirds (20 species). There are also 6 shorebirds, 3 waterbirds, and 8 waterfowl species. Overall, 35% of waterfowl and 29% of shorebirds are priority bird species, compared to 18% of landbirds and 18% of waterbirds (Table 2). There are 9 (24%) priority species that are formally protected under the Government of Canada's *Species at Risk Act* (SARA; Species at Risk Public Registry 2012): 7 landbirds, 1 shorebird and 1 waterfowl species (Table 3).

In MBU 10 NL, there are 39 priority species (Table 2): 1 landbird, 8 shorebirds, 18 waterbirds, and 12 waterfowl species. Overall, 50% of waterfowl and 41% of waterbirds are priority bird species compared to 31% of shorebirds and 25% of landbirds. There are 5 (13%) priority species that are formally protected under the Government of Canada's SARA (Species at Risk Public Registry 2012): 2 shorebirds, 1 waterbird, and 2 waterfowl (Table 3).

In MBU 12 NL, there are 29 priority species (Table 2): 12 shorebirds, 9 waterbirds, and 8 waterfowl species. There are no landbirds identified as priority species in this planning unit. Overall, 48% of shorebirds are priority bird species compared to 36% of waterfowl and 20% of waterbirds. There are 6 (21%) priority species that are formally protected under the Government of Canada's SARA (Species at Risk Public Registry 2012): 2 shorebirds, 2 waterbirds, and 2 waterfowl (Table 3).

The most frequent reasons for considering landbirds as priority species for all planning units

in this strategy are because of regional concerns or stewardship, whereas the reasons for considering shorebirds or waterbirds as priority species are typically because of national or continental concerns (Table 3). The main explanation for this difference is due to a lack of information at the regional level for many of the shorebird and waterbird species. As for waterfowl, the main reason for including them as priority species is because their status was ranked as moderately high, high or highest under the North American Waterfowl Management Plan (NAWMP Committee 2004; Table 3).

Table 1. Priority bird species in BCR 8 NL, MBU 10 NL and MBU 12 NL, population objective, and the reason for priority status.
Note: A "Y" indicates a priority species occurrence within the planning unit followed by the reason for inclusion as a priority listing.

BCR 8 NL	MBU 10 NL	MBU 12 NL	Priority Species	Bird Group	Population Objective[1]	SARA[2]	COSEWIC[3]	Provincial Listing[4]	National/Continental Concern	National/Continental Stewardship	Regional/Subregional Concern	Regional/Subregional Stewardship	Waterfowl[5]	Expert Review[6]
Y			Barn Swallow	Landbirds	Assess/Maintain		TH							
Y			Black-backed Woodpecker	Landbirds	Maintain current					Y		Y		
Y			Black-throated Green Warbler	Landbirds	Maintain current				Y	Y				
Y			Bobolink	Landbirds	Assess/Maintain		TH		Y					
Y			Chimney Swift	Landbirds	Assess/Maintain†	TH	TH	TH	Y					
Y			Common Nighthawk	Landbirds	Assess/Maintain†	TH	TH	TH	Y					
Y			Gray-cheeked Thrush	Landbirds	Assess/Maintain			VU						
Y			Magnolia Warbler	Landbirds	Maintain current				Y	Y				
Y			Mourning Warbler	Landbirds	Maintain current				Y	Y		Y		
Y			Northern Hawk Owl	Landbirds	Maintain current							Y		
Y			Olive-sided Flycatcher	Landbirds	Maintain current†	TH	TH	TH	Y		Y			

[1] Population objectives apply in all units where the species is priority (BCR 8 NL and/or MBU 10 NL and/or MBU 12 NL) unless otherwise indicated.
[2] Species listed on Schedule 1 under the SARA as Endangered (EN), Threatened (TH) or Special Concern (SC) (Species at Risk Public Registry 2012).
[3] Species assessed by the Committee on the Status of Endangered Wildlife in Canada as Endangered (EN), Threatened (TH) or Special Concern (SC; COSEWIC 2012).
[4] Species listed under Newfoundland and Labrador's *Endangered Species Act* as Endangered (EN), Threatened (TH) or Vulnerable (VU) (NL Department of Environment and Conservation 2013b).
[5] Waterfowl identified as "key species" in the Eastern Habitat Joint Venture Implementation Plan 2007 – 2012, or scored as "Moderately-High", "High" or "Highest" in either the breeding or non-breeding conservation and/or monitoring needs for waterfowl conservation regions 8 or 8.2 (analogous to BCR 8) of the North American Waterfowl Management Plan (NAWMP Committee 2004).
[6] Species added or removed by the NL Technical Working Group.
† This interim population objective will be replaced once recovery documents for this SARA-listed species are published.

Table 1 continued

BCR 8 NL	MBU 10 NL	MBU 12 NL	Priority Species	Bird Group	Population Objective[1]	SARA[2]	COSEWIC[3]	Provincial Listing[4]	National/Continental Concern	National/Continental Stewardship	Regional/Subregional Concern	Regional/Subregional Stewardship	Waterfowl[5]	Expert Review[6]
Y			Peregrine Falcon (*anatum/tundrius)*	Landbirds	Assess/Maintain†	SC	SC	VU		Y				
Y			Purple Finch	Landbirds	Maintain current						Y	Y		
Y			Red Crossbill (*percna*)	Landbirds	Recovery objective	EN	EN	EN	Y		Y	Y		
Y			Rusty Blackbird	Landbirds	Assess/Maintain†	SC	SC	VU	Y					
Y			Sharp-shinned Hawk	Landbirds	Maintain current							Y		
Y			Short-eared Owl	Landbirds	Assess/Maintain†	SC	SC	VU	Y					
	Y		Snowy Owl	Landbirds	Maintain current					Y				
Y			Swamp Sparrow	Landbirds	Maintain current				Y	Y		Y		
Y			White-throated Sparrow	Landbirds	Maintain current				Y	Y				
Y			Yellow-bellied Flycatcher	Landbirds	Maintain current					Y		Y		
Y			American Golden-Plover	Shorebirds	Assess/Maintain				Y					
		Y	Black-bellied Plover	Shorebirds	Assess/Maintain				Y					
		Y	Dunlin[7]	Shorebirds	Assess/Maintain				Y					
Y		Y	Least Sandpiper[7]	Shorebirds	Assess/Maintain				Y					
	Y	Y	Lesser Yellowlegs	Shorebirds	Assess/Maintain				Y					
Y	Y	Y	Piping Plover (*melodus*)	Shorebirds	Recovery objective	EN	EN	EN	Y					
	Y	Y	Purple Sandpiper	Shorebirds	Assess/Maintain				Y					
	Y	Y	Red Knot (*rufa*)	Shorebirds	Assess/Maintain†	EN	EN	EN	Y					
	Y	Y	Sanderling	Shorebirds	Assess/Maintain				Y					

[7] The shorebird priority species were selected based on Andres 2009. A recent assessment (Andres et al. 2012) now suggests that the populations of some of these shorebird species (e.g. Dunlin, Least Sandpiper and Solitary Sandpiper) are stable. Subsequent database versions will be modified to account for this new information.

Table 1 continued

BCR 8 NL	MBU 10 NL	MBU 12 NL	Priority Species	Bird Group	Population Objective[1]	SARA[2]	COSEWIC[3]	Provincial Listing[4]	National/Continental Concern	National/Continental Stewardship	Regional/Subregional Concern	Regional/Subregional Stewardship	Waterfowl[5]	Expert Review[6]
Y		Y	Semipalmated Sandpiper	Shorebirds	Assess/Maintain				Y					
	Y		Solitary Sandpiper[7]	Shorebirds	Assess/Maintain				Y					
Y	Y	Y	Whimbrel	Shorebirds	Assess/Maintain				Y					
	Y	Y	White-rumped Sandpiper	Shorebirds	Maintain current									Added
		Y	Willet	Shorebirds	Assess/Maintain				Y					
Y			Wilson's Snipe	Shorebirds	Maintain current				Y					
Y			American Bittern	Waterbirds	Maintain current				Y			Y		
	Y		Atlantic Puffin	Waterbirds	Maintain current									Added
		Y	Black-headed Gull	Waterbirds	Maintain current									Added
	Y		Black-legged Kittiwake	Waterbirds	Maintain current					Y		Y		Added (MBU 10 NL), Removed (MBU 12 NL)
Y	Y		Common Loon	Waterbirds	Maintain current (BCR 8 NL) Assess/Maintain (MBU 10 NL)				Y			Y		
	Y		Common Murre	Waterbirds	Assess/Maintain				Y					
Y	Y	Y	Common Tern	Waterbirds	Maintain current (BCR 8 NL) Assess/Maintain (MBU 10 NL, MBU 12 NL)				Y			Y		
	Y		Cory's Shearwater	Waterbirds	Assess/Maintain				Y					
	Y	Y	Dovekie	Waterbirds	Assess/Maintain						Y			
	Y	Y	Great Shearwater	Waterbirds	Assess/Maintain						Y			
	Y		Great Skua	Waterbirds	Assess/Maintain				Y					

Table 1 continued

BCR 8 NL	MBU 10 NL	MBU 12 NL	Priority Species	Bird Group	Population Objective[1]	SARA[2]	COSEWIC[3]	Provincial Listing[4]	National/Continental Concern	National/Continental Stewardship	Regional/Subregional Concern	Regional/Subregional Stewardship	Waterfowl[5]	Expert Review[6]
		Y	Horned Grebe	Waterbirds	Assess/Maintain[†]	EN[8]	EN[8] SC[9]		Y					
	Y	Y	Ivory Gull	Waterbirds	Recovery objective	EN	EN	EN	Y					
	Y		Leach's Storm-Petrel	Waterbirds	Assess/Maintain				Y					
	Y		Manx Shearwater	Waterbirds	Assess/Maintain				Y					
	Y	Y	Northern Gannet	Waterbirds	Maintain current					Y		Y		Added (MBU 12 NL)
	Y		Razorbill	Waterbirds	Assess/Maintain						Y			
	Y	Y	Red-necked Grebe	Waterbirds	Assess/Maintain				Y		Y			
	Y		Red-throated Loon	Waterbirds	Assess/Maintain				Y					
	Y	Y	Sooty Shearwater	Waterbirds	Assess/Maintain				Y					
	Y		Thick-billed Murre	Waterbirds	Assess/Maintain				Y					
Y	Y	Y	American Black Duck	Waterfowl	Maintain current				Y				EHJV, NAWMP	
	Y	Y	Barrow's Goldeneye (Eastern)	Waterfowl	Assess/Maintain	SC	SC	VU	Y				EHJV, NAWMP	
	Y	Y	Black Scoter	Waterfowl	Assess/Maintain				Y				NAWMP	Added (MBU 12 NL)
Y	Y	Y	Canada Goose (North Atlantic)	Waterfowl	Increase 50%				Y				EHJV, NAWMP	
	Y	Y	Common Eider	Waterfowl	Increase 100% (MBU 10 NL) Assess/Maintain				Y				EHJV, NAWMP	

[8] Status applies to the Magdalen Islands Population of Horned Grebe.
[9] Status applies to the Western Population of Horned Grebe.

Table 1 continued

BCR 8 NL	MBU 10 NL	MBU 12 NL	Priority Species	Bird Group	Population Objective[1]	SARA[2]	COSEWIC[3]	Provincial Listing[4]	National/Continental Concern	National/Continental Stewardship	Regional/Subregional Concern	Regional/Subregional Stewardship	Waterfowl[5]	Expert Review[6]
					(MBU 12 NL)									
Y	Y	Y	Common Goldeneye	Waterfowl	Maintain current (BCR 8 NL) Assess/Maintain (MBU 10 NL, MBU 12 NL)				Y			Y	EHJV, NAWMP	
Y	Y		Common Merganser	Waterfowl	Assess/Maintain							Y	NAWMP	
Y			Green-winged Teal	Waterfowl	Increase 50%								EHJV	
Y	Y	Y	Harlequin Duck (Eastern)	Waterfowl	Assess/Maintain	SC	SC	VU	Y				EHJV, NAWMP	
	Y		King Eider	Waterfowl	Assess/Maintain				Y				NAWMP	
	Y	Y	Long-tailed Duck	Waterfowl	Assess/Maintain				Y				EHJV, NAWMP	Added (MBU 12 NL)
Y			Ring-necked Duck	Waterfowl	Increase 100%							Y	EHJV, NAWMP	
Y	Y		Surf Scoter	Waterfowl	Assess/Maintain				Y				EHJV, NAWMP	Removed (MBU 12 NL)
	Y		White-winged Scoter	Waterfowl	Assess/Maintain				Y				NAWMP	Removed (MBU 12 NL)

Table 2. Summary of priority species, by bird group, in BCR 8 NL, MBU 10 NL and MBU 12 NL.

Bird Group	Total Species (% of avifauna)	Total Priority Species	Percent Listed as Priority	Percent of Priority List
BCR 8 NL				
Landbirds	109 (64%)	20	18%	54%
Shorebirds	21 (12%)	6	29%	16%
Waterbirds	17 (10%)	3	18%	8%
Waterfowl	23 (14%)	8	35%	22%
Total	**170**	**37**	**22%**	**100%**
MBU 10 NL				
Landbirds	4 (4%)	1	25%	3%
Shorebirds	26 (27%)	8	31%	20%
Waterbirds	44 (45%)	18	41%	46%
Waterfowl	24 (24%)	12	50%	31%
Total	**98**	**39**	**40%**	**100%**
MBU 12 NL				
Shorebirds	25 (28%)	12	48%	41%
Waterbirds	44 (48%)	9	20%	31%
Waterfowl	22 (24%)	8	36%	28%
Total	**91**	**29**	**32%**	**100%**

Table 3. Number of priority species in BCR 8 NL, MBU 10 NL and MBU 12 NL by reason for priority status.

Reasons for Priority Listing[1]	Landbirds	Shorebirds	Waterbirds	Waterfowl
BCR 8 NL Total	**20**	**6**	**3**	**8**
COSEWIC[2]	9	1	0	1
Federal SARA listed[3]	7	1	0	1
Provincially listed[4]	8	1	0	1
NAWMP[5]	–	–	–	8
National/Continental Concern	12	6	3	5
National/Continental Stewardship	8	–	–	–
Regional/Subregional Concern	3	–	–	–
Regional/Subregional Stewardship	8	–	3	3
Added during expert reviews[6]	0	0	0	0
MBU 10 NL Total	**1**	**8**	**18**	**12**
COSEWIC[2]	0	2	1	2
Federal SARA listed[3]	0	2	1	2
Provincially listed[4]	0	2	1	2
NAWMP[5]	–	–	–	12
National/Continental Concern	–	7	13	11
National/Continental Stewardship	1	–	2	–
Regional/Subregional Concern	–	–	4	–
Regional/Subregional Stewardship	–	–	4	2
Added during expert reviews[6]	0	1	2	0
MBU 12 NL Total	**0**	**12**	**9**	**8**
COSEWIC[2]	0	2	2	2
Federal SARA listed[3]	0	2	2	2
Provincially listed[4]	0	2	1	2
NAWMP[5]	–	–	–	8
National/Continental Concern	–	11	5	8
National/Continental Stewardship	–	–	1	–
Regional/Subregional Concern	–	–	3	–
Regional/Subregional Stewardship	–	–	2	1
Added during expert reviews[6]	0	1	2	0

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

[2] COSEWIC indicates species assessed by the Committee on the Status of Endangered Wildlife in Canada as Endangered, Threatened or Special Concern (COSEWIC 2012).

[3] Species listed on Schedule 1 of *the Species at Risk Act* as Endangered, Threatened, or Special Concern (Species at Risk Public Registry 2012).

[4] Species listed under Newfoundland and Labrador *Endangered Species Act* as Endangered, Threatened or Vulnerable (NL Department of Environment and Conservation 2013).

[5] Waterfowl identified as "key species" in the Eastern Habitat Joint Venture Implementation Plan 2007 – 2012, or scored as "Moderately-High", "High" or "Highest" " in either the breeding or non-breeding conservation and/or monitoring needs for waterfowl conservation regions 8 or 8.2 (analogous to BCR 8) of the North American Waterfowl Management Plan (NAWMP Committee 2004).

[6] Species added by the NL Technical Working Group.

Element 2: Habitats Important to Priority Species

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

The assignment of habitat associations for priority bird species was done through literature review and expert consultation. For each priority species in BCR 8 NL, MBU 10 NL and MBU 12 NL, all of their known habitat associations were considered, not just the primary habitat associations. Because of variability in the quality and availability of information related to species-habitat associations, quantifying the relative importance of any given habitat was not possible. In this document, statements regarding the importance of habitat types for priority bird species are related to the number of priority birds associated with each habitat and may not reflect the overall importance of the habitat to all bird species in the planning unit.

In BCR 8 NL, wetlands are used by the greatest number of priority bird species (18 species; Fig. 4). More priority bird species are found in coniferous forests (15 species) than in mixed wood forests (2 species; Fig. 4). Coastal (above high tide) and riparian habitats are also important to priority bird species as they are used by 14 and 13 priority species, respectively. As for mixed woods, few priority bird species use cultivated and managed areas or herbaceous habitats (3 species; Fig. 4).

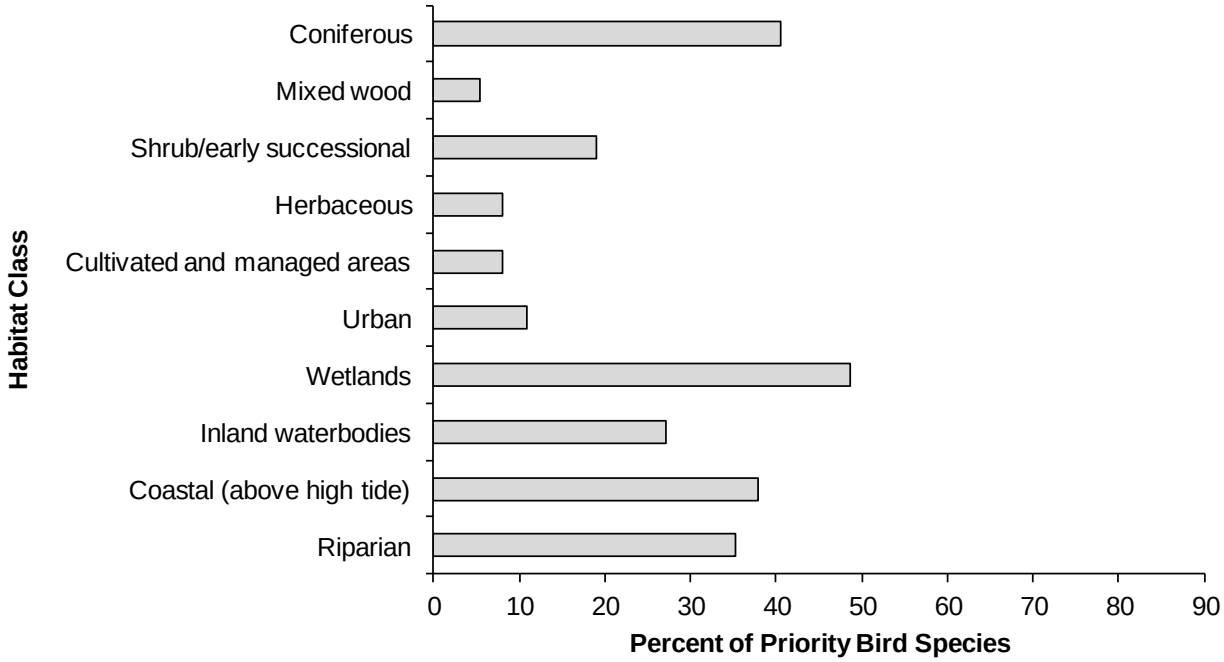


Figure 4. Percent of priority species that are associated with each habitat class in BCR 8 NL.
Note: The total exceeds 100% because each species may be assigned to more than one habitat.

There are only two habitat classes in MBU 10 NL and MBU 12 NL: coastal (intertidal) and marine waters (which include nearshore waters and continental shelf). In the Newfoundland-Labrador Shelves marine unit (MBU 10), there are 28 priority bird species associated with the intertidal coast while 30 priority bird species are found in marine waters (Fig. 5). In the Gulf of St. Lawrence marine unit (MBU 12), there are 23 priority bird species associated with the intertidal coast while 16 priority bird species are found in marine waters (Fig. 6).

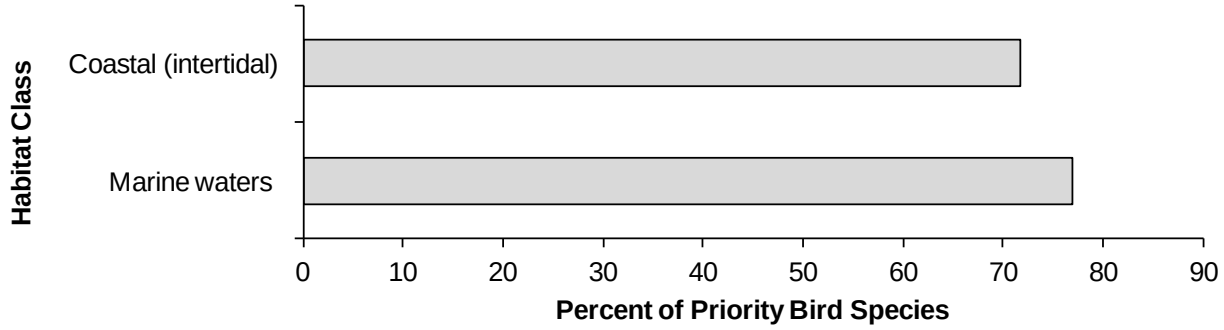


Figure 5. Percent of priority species that are associated with each habitat class in MBU 10 NL, the Newfoundland-Labrador Shelves.
Note: The total exceeds 100% because each species may be assigned to more than one habitat.

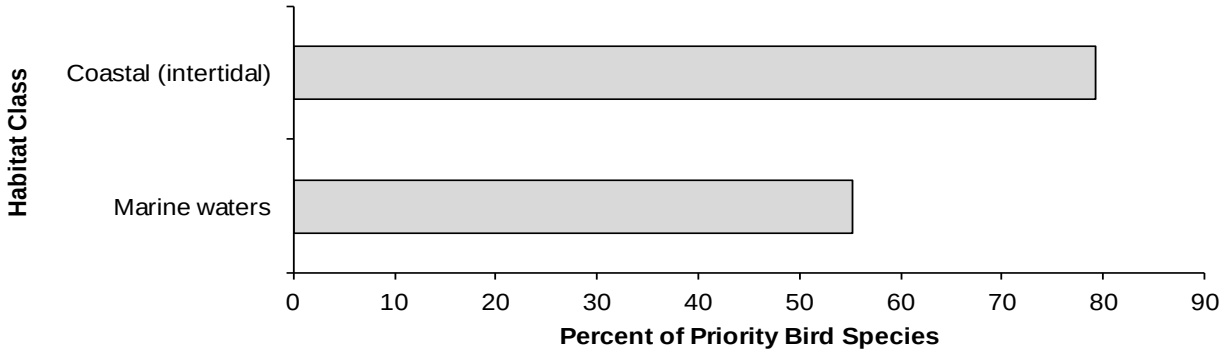


Figure 6. Percent of priority species that are associated with each habitat class in MBU 12 NL, the Gulf of St. Lawrence.

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

Element 3: Population Objectives

Population objectives allow us to measure and evaluate conservation success. The objectives in this strategy are assigned to categories and are based on a quantitative or qualitative assessment of species' population trends. If the population trend of a species is unknown, the objective is set as "assess and maintain", and a monitoring objective is given. For any species listed under the SARA or under provincial/territorial endangered species legislation, Bird Conservation Strategies defer to population objectives in available Recovery Strategies and Management Plans. The ultimate measure of conservation success will be the extent to which population objectives have been reached over the next 40 years. Population objectives do not currently factor in feasibility of achievement, but are held as a standard against which to measure progress.

In BCR 8 NL, the population objective for 17 priority bird species is to maintain current levels, an indication that population trends for these species are stable (Fig. 7). They are still considered priorities due to factors such as national/continental and regional/subregional concern or stewardship status (Table 1). Fifteen priority bird species have a population objective of "assess/maintain", which signifies that there are insufficient data to reliably assess a population trend therefore additional monitoring is required for these species (Fig. 7). There are 5 priority species with identified population declines and for which the objective is to recover or increase population size by 50% or 100% (Fig. 7). The Piping Plover (*melodus)* and Red Crossbill (*percna*) have specific recovery objectives described in their respective SARA Recovery Strategies (Table 1). The Canada Goose (North Atlantic) and Green-winged Teal both have a population objective to increase by 50% while the Ring-necked Duck has an EHJV objective to increase by 100% (Fig. 7).

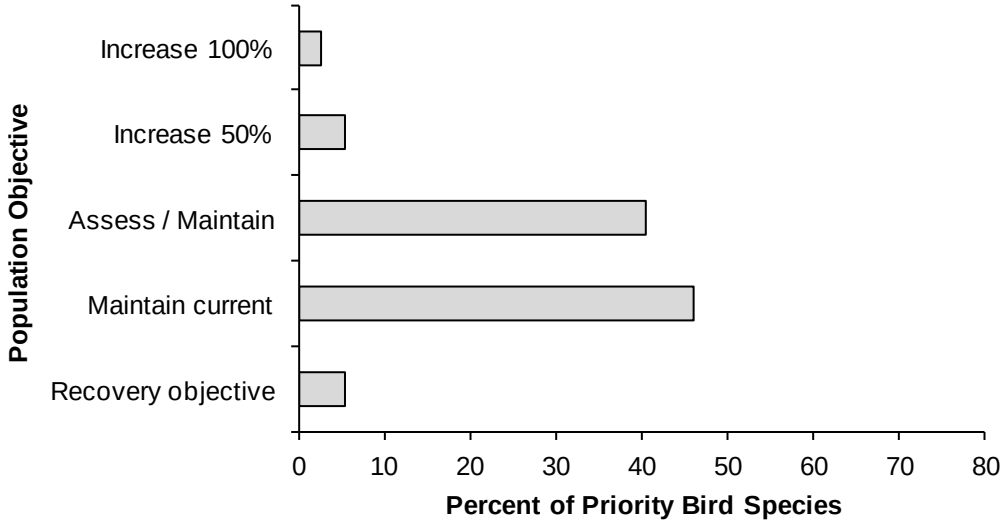


Figure 7. Percent of priority species that are associated with each population objective category in BCR 8 NL.

In MBU 10 NL, there is insufficient data to reliably assess a trend for the majority of priority species (29 species); therefore, their population objectives are to “assess/maintain” (Fig. 8). Six priority species have a population objective of “maintain current” while 4 priority species have identified population declines and were given population objectives to recover or increase population size by 50% or 100%. The Piping Plover (*melodus*) and Ivory Gull have specific recovery objectives described in their respective SARA Recovery Strategies (Table 1). The Canada Goose (North Atlantic) has a population objective to increase by 50% while the Common Eider has an EHJV objective to increase by 100% (Fig. 8).

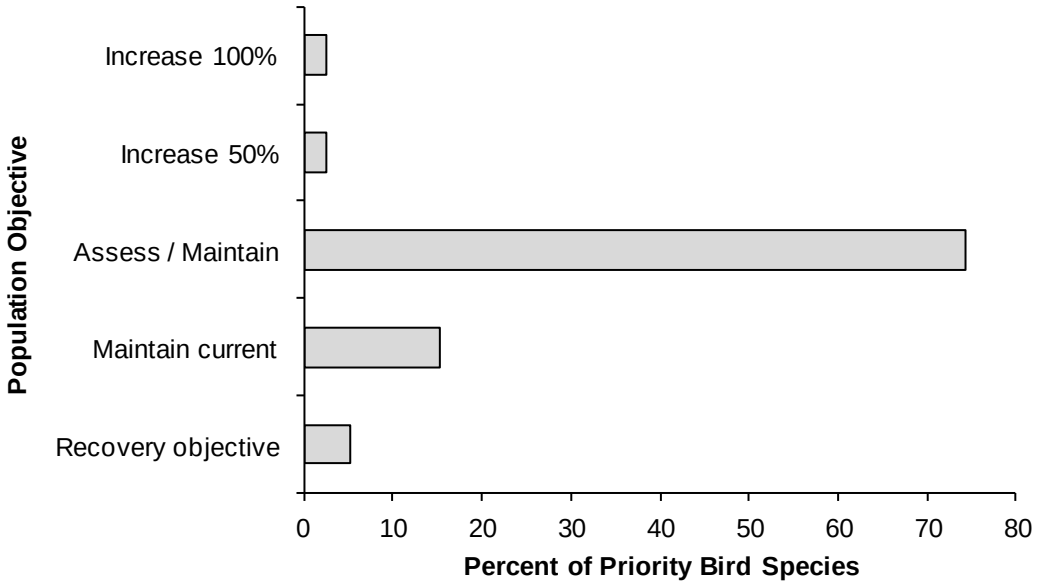


Figure 8. Percent of priority species that are associated with each population objective category in MBU 10 NL.

In MBU 12 NL, there is insufficient data to reliably assess a trend for the majority of priority species (22 species) and the objective is to “assess/maintain” populations (Fig. 9). Four priority species have a population objective of “maintain current”, while 3 priority species have identified population declines and were given population objectives to recover or increase population size by 50% or 100%. The Piping Plover (*melodus*) and Ivory Gull have specific recovery objectives described in their respective SARA Recovery Strategies (Table 1) while the Canada Goose (North Atlantic) has an EHJV objective to increase by 50% (Fig. 9).

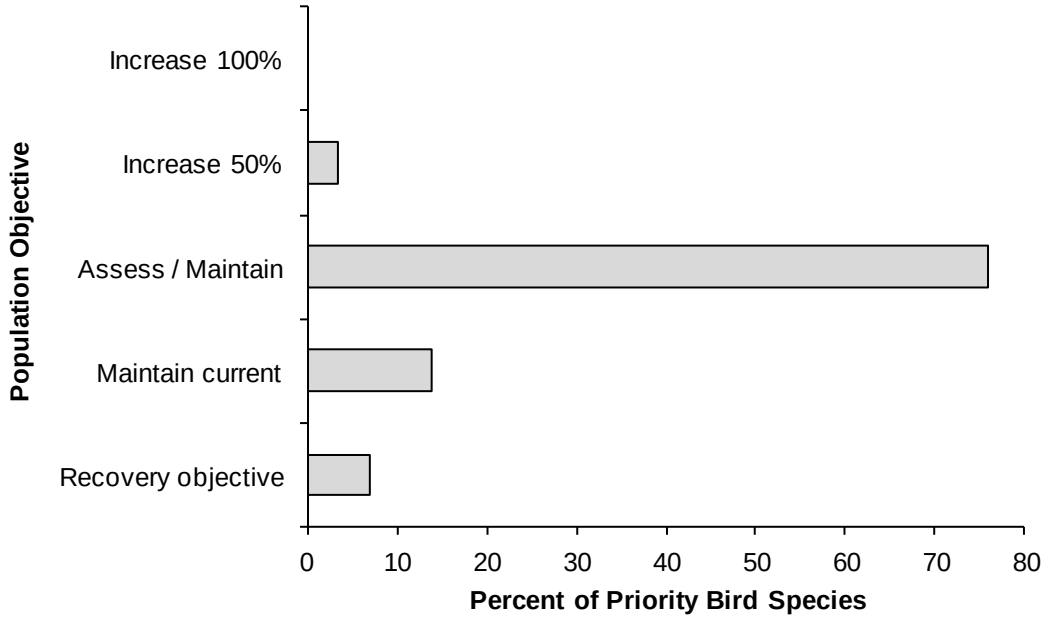


Figure 9. Percent of priority species that are associated with each population objective category in MBU 12 NL.

Element 4: Threat Assessment for Priority Species

The threats assessment process identifies threats believed to have a population-level effect on individual priority species. These threats are assigned a relative magnitude (Low, Medium, High, Very High), based on their scope (the proportion of the species' range within the subregion that is impacted) and severity (the relative impact on the priority species' population). This allows us to target conservation actions towards threats with the greatest effects on suites of species or in broad habitat classes. Some well-known conservation issues (such as predation by domestic cats or climate change) may not be identified in the literature as significant threats to populations of an individual priority species and therefore may not be captured in the threat assessment. However, they merit attention in conservation strategies because of the large numbers of individual birds affected in many regions of Canada. We have incorporated them in a separate section on Widespread Issues in the full version of the strategy, but, unlike other threats, they are not ranked. In BCR 8 NL, MBU 10 NL and MBU 12 NL, a category was added to the threats classification scheme to allow for the inclusion of inadequate monitoring or research information (category 12 "Other direct threats" and sub-category 12.1 "Information lacking"). The following discussion focuses mainly on the highest ranked threats and notes a few medium and low threats where appropriate.

A complete list of threats to priority species in each planning unit is included in Appendix 1 of the full strategy. Some of the threats identified are not unique to a particular planning unit or a type of habitat (for example, legal hunting or poaching and incidental take by hunters/trappers) while others are more specific (for example, habitat loss due to tourism and recreational housing development in coastal habitats). These threats are categorized as per Salafsky et al. 2008.

Once individually ranked threats to priority species are rolled up for each habitat class, the overall threat magnitude is "high" in the shrub/early successional, wetland, coastal (above high tide) and riparian habitats of BCR 8 NL, as well as the intertidal coasts of both MBU 10 NL and MBU 12 NL and the marine waters of MBU 10 NL. The other habitat classes have an overall threat magnitude of "medium" except for mixed wood forests, herbaceous habitats and inland waterbodies of BCR 8 NL, which have a threat magnitude of "low" (Table 4).

In BCR 8 NL, several high-ranked threats were identified, including gaps in knowledge of the distribution, abundance and population trends of priority bird species (12.1 Information lacking). Climate change created habitat loss or degradation from changes to habitat structures, food webs, shifts in species' ranges and altered timing of seasonal cues (11.1 Habitat shifting & alteration) in shrub/early successional, wetlands, coastal (above high tide) and riparian habitats. Climate change also resulted in habitat degradation or mortality from an increase in frequency and severity of storms (11.4 Storms and flooding) that lead to a loss of productivity and/or reduction in food availability in wetlands, cultivated and managed areas, coniferous, urban, riparian, and coastal (above high tide) habitats (Fig. 10).

Medium-ranked threats to priority species in BCR 8 NL include population reductions in American Black Ducks due to hybridization with Mallards, competition with other species (e.g., grazing geese, Red-winged Blackbirds or Common Grackles) for resources and increased predator populations due to anthropogenic land modifications (8.2 Problematic native species). Habitat loss or degradation from the destruction and manipulation of inland waterbodies, wetlands, coastal (above high tide), and riparian habitats due to changes in hydrologic regimes, water management or river channelization (7.2 Dams & water management/use) was also ranked medium, as was mortality from cold snaps in spring due to climate change (11.3 Temperature extremes) in coniferous, wetland, cultivated and managed areas, urban, riparian, and coastal (above high tide) habitats. Other threats that were frequently identified but ranked as low overall in BCR 8 NL were habitat degradation or mortality due to chemical contamination mainly from the use of pesticides related to forestry activities in coastal habitats (above high tide), coniferous forests, mixed wood forests, inland waterbodies and wetlands (9.3 Agricultural & forestry effluents). Similarly, mortality due to legal hunting or poaching and incidental take by hunters/trappers (5.1 Hunting & collecting of terrestrial animals) was a frequent low-ranked threat in all habitats except mixed wood forests, cultivated and managed areas, and herbaceous (Fig. 10).

In MBU 10 NL and MBU 12 NL, the highest ranked threat categories (all ranked “high” in MBU 10 and all ranked “medium” in MBU 12) were habitat degradation, lethal and/or sub-lethal effects due to chemical or heavy metal contamination, especially from oil spills and discharges by ships or drilling platforms (9.2 Industrial & military effluents), as well as gaps in knowledge of the distribution, abundance and population trends of priority bird species (12.1 Information lacking) in both coastal (intertidal) habitats and marine waters (Figs. 11, 12). There are several medium-ranked threats in MBU 10 NL including mortality from entanglement in fishing gear and habitat degradation from competition with commercial fisheries for prey in marine waters (5.4 Fishing & harvesting aquatic resources). Climate change resulted in habitat degradation from changes to habitat structure and food webs (11.1 Habitat shifting & alteration) as well as temporal, geographic distribution and changes in sea ice thickness (11.3 Temperature extremes). Finally, population reductions due to the hybridization of American Black Ducks with Mallards in both marine habitats, and increases in predator populations due to anthropogenic land modifications (8.2 Problematic native species) in coastal (intertidal) habitats, were also ranked medium in MBU 10 NL (Fig. 11). In MBU 12 NL, additional medium-ranked threats were habitat degradation from climate-change-induced habitat structure alterations (11.1 Habitat shifting & alteration) such as tidal currents and amplitudes in coastal (intertidal) habitats, as well as reductions in survival due to an increase in predator populations as a result of anthropogenic land modifications (8.2 Problematic native species) in marine waters (Fig. 12).

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

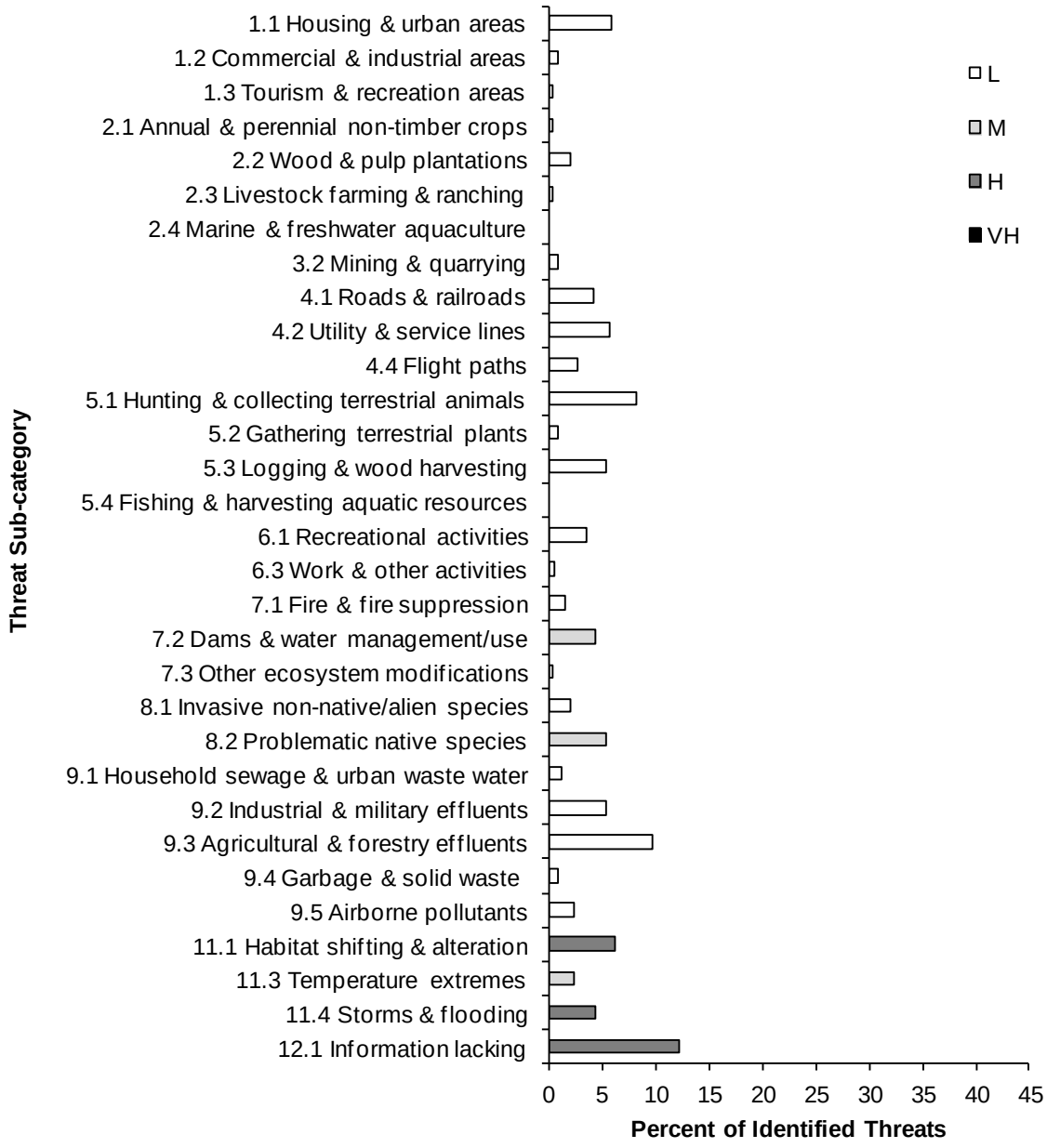


Figure 10. Percent of identified threats to priority species within BCR 8 NL by threat sub-category. Each bar represents the percent of the total number of threats identified for each threat sub-category in BCR 8 NL (for example, if 100 threats were identified in total for all priority species in BCR 8 NL, and 10 of those threats were in the category 1.1 Housing & urban areas, the bar on the graph would represent this as 10%). Shading in the bars (VH = very high, H = high, M = medium and L = low) represents the rolled-up magnitude of all threats in each threat subcategory in the BCR.

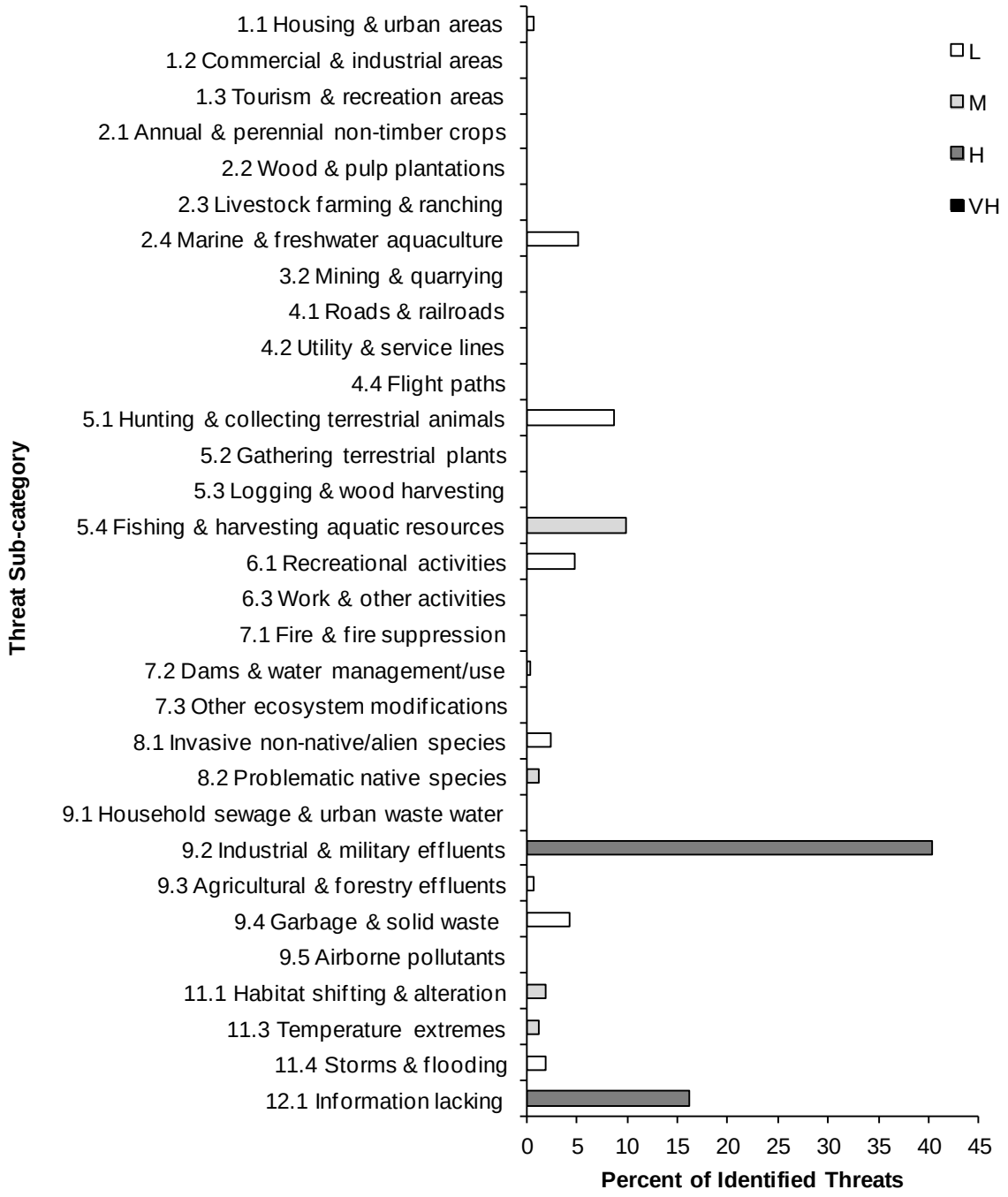


Figure 11. Percent of identified threats to priority species within MBU 10 NL by threat sub-category.
Each bar represents the percent of the total number of threats identified for each threat sub-category in MBU 10 NL (for example, if 100 threats were identified in total for all priority species in MBU 10 NL, and 10 of those threats were in the category 1.1 Housing & urban areas, the bar on the graph would represent this as 10%). Shading in the bars (VH = very high, H = high, M = medium and L = low) represents the rolled-up magnitude of all threats in each threat subcategory in the MBU.

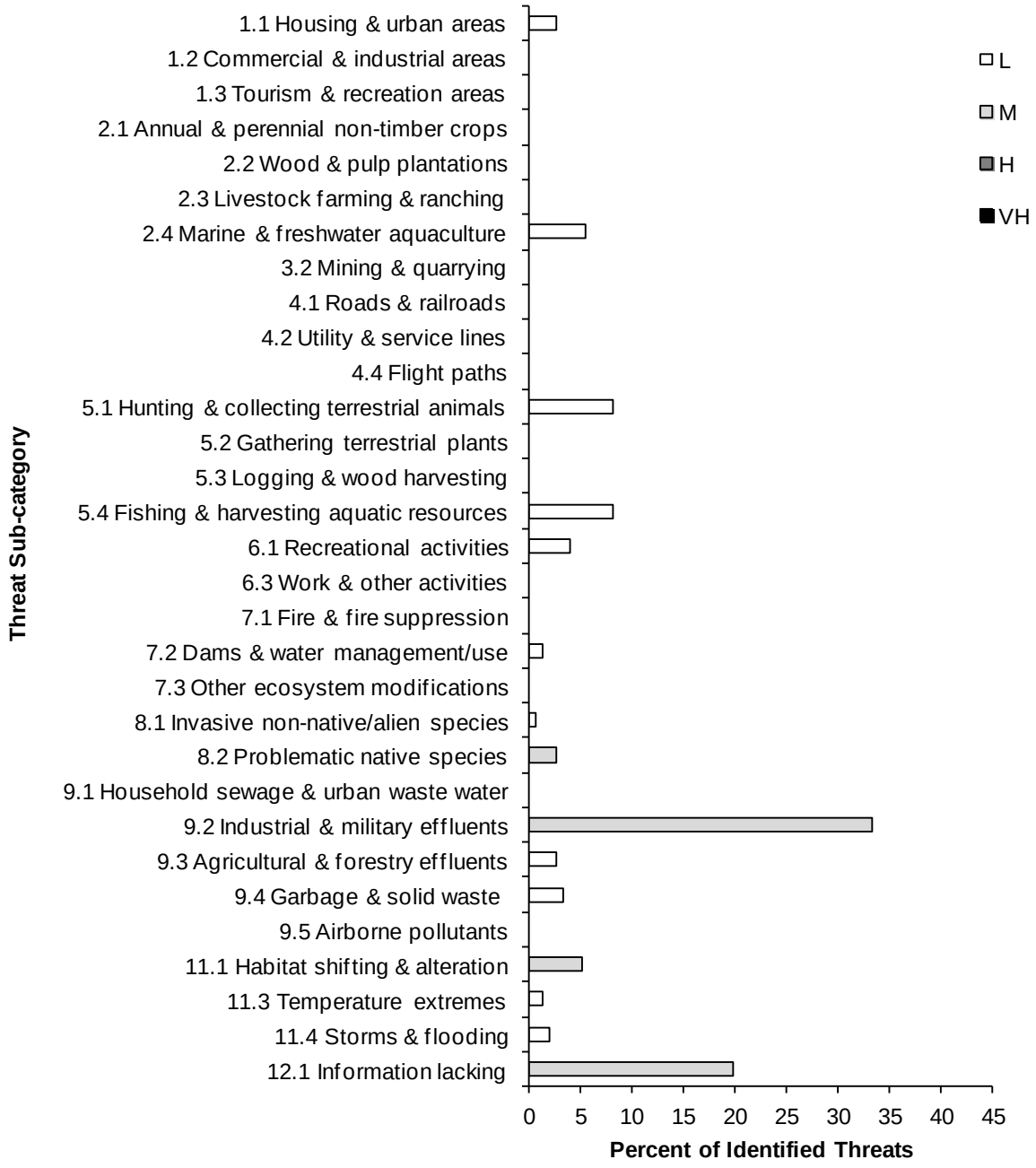


Figure 12. Percent of identified threats to priority species within MBU 12 NL by threat sub-category. Each bar represents the percent of the total number of threats identified for each threat sub-category in MBU 12 NL (for example, if 100 threats were identified in total for all priority species in MBU 12 NL, and 10 of those threats were in the category 1.1 Housing & urban areas, the bar on the graph would represent this as 10%). Shading in the bars (VH = very high, H = high, M = medium and L = low) represents the rolled-up magnitude of all threats in each threat subcategory in the MBU.

Table 4. Relative magnitude of identified threats to priority species within BCR 8 NL, MBU 10 NL and MBU 12 NL by threat category and broad habitat class.

Note: Overall ranks were generated through a roll-up procedure described in Kennedy et al. 2012. L represents Low magnitude threats; M = Medium; H = High; VH = Very High. Blank cells indicate that no priority species had threats identified in the threat category/habitat class combination.

	BCR 8 NL											MBU 10 NL			MBU 12 NL		
Threat Category	**Habitat Class**											**Habitat Class**			**Habitat Class**		
	Coniferous	Mixed wood	Shrub/early successional	Herbaceous	Cultivated and managed areas	Urban (artificial surfaces & bare areas)	Wetlands	Inland waterbodies	Coastal (above high tide)	Riparian	**Overall**	Marine waters	Coastal (intertidal)	**Overall**	Marine waters	Coastal (intertidal)	**Overall**
Overall	**M**	**L**	**H**	**L**	**M**	**M**	**H**	**L**	**H**	**H**		**H**	**H**		**M**	**H**	
1. Residential & commercial development	L		L			M	L	L	L	L	**L**		L	**L**		L	**L**
2. Agriculture & aquaculture	L	L			M		L			L	**L**	L	L	**L**	L	L	**L**
3. Energy production & mining			L						L	L	**L**						
4. Transportation & service corridors	L	L	L		L	L	L	L	L	L	**L**						
5. Biological resource use	M	L	L			L	L	L	L	L	**L**	H	M	**M**	M	L	**L**
6. Human intrusions & disturbance			L	L		L	L	L	M	L	**L**	L	M	**L**	L	L	**L**
7. Natural system modifications	M				L		M	M	M	L	**M**		L	**L**		L	**L**
8. Invasive & other problematic species & genes	M	L	L	L	L	L	L	L	H	L	**M**	L	H	**M**	L	H	**M**
9. Pollution	L	L	L	L	L	L	L	L	L	L	**L**	VH	M	**H**	H	M	**M**
11. Climate change & severe weather	M		H		H	M	H	L	H	H	**H**	M	H	**M**	M	H	**M**
12. Other direct threats	M		H	L	M	M	H	L	H	H	**H**	H	H	**H**	M	H	**M**

Element 5: Conservation Objectives

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

In BCR 8 NL, most conservation objectives pertained to ensuring the availability of adequate habitat for priority bird species (Fig. 13), while in MBU 10 NL and MBU 12 NL, most conservation objectives related to reducing mortality or increasing productivity of priority bird species (Figs. 14, 15), which was also a conservation objective for 25% of priority bird species in BCR 8 NL (Fig. 13).

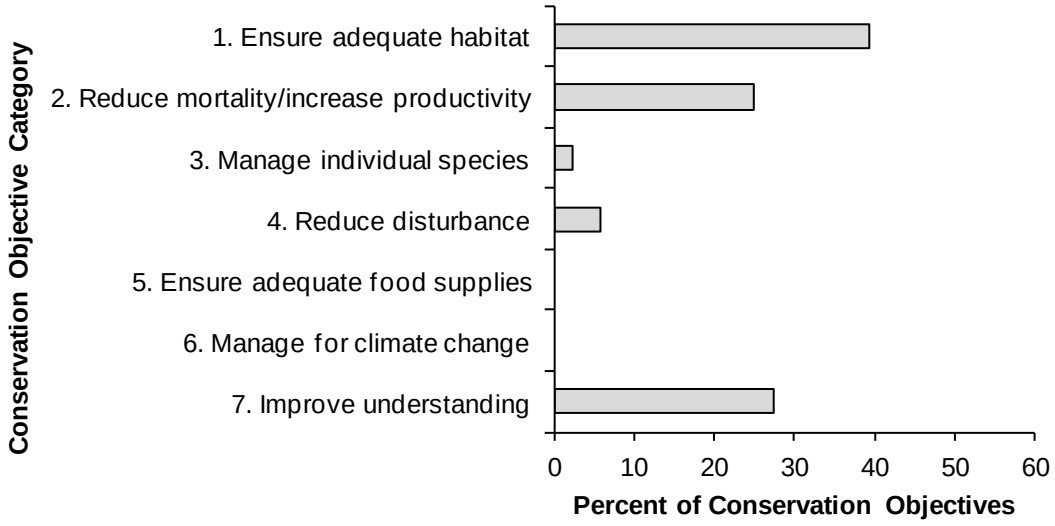


Figure 13. Percent of all conservation objectives assigned to each conservation objective category in BCR 8 NL.
Note: Widespread issues (including climate change) were excluded from this calculation, as these are detailed in Section 3 of the full strategy.

However, in all planning units, improving our understanding of priority bird species was the second-most frequently identified conservation objective (Figs. 13, 14, 15). For the majority of priority bird species in the marine units, we do not have enough information on population trends to set specific population objectives, while for most priority birds in BCR 8 NL, information is required to understand the causes of population decline on the potential effects of climate change.

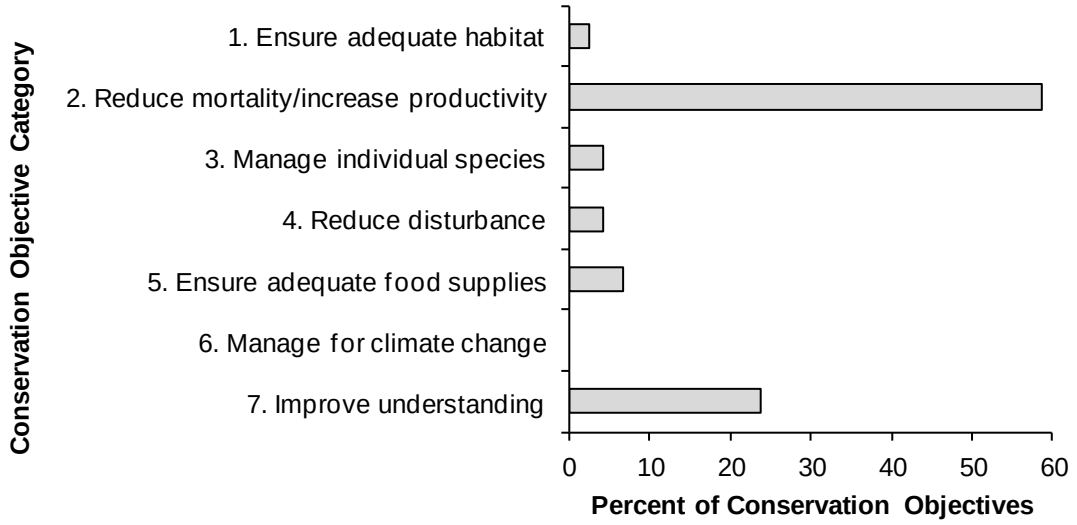


Figure 14. Percent of all conservation objectives assigned to each conservation objective category in MBU 10 NL.

Note: Widespread issues (including climate change) were excluded from this calculation, as these are detailed in Section 3 of the full strategy.

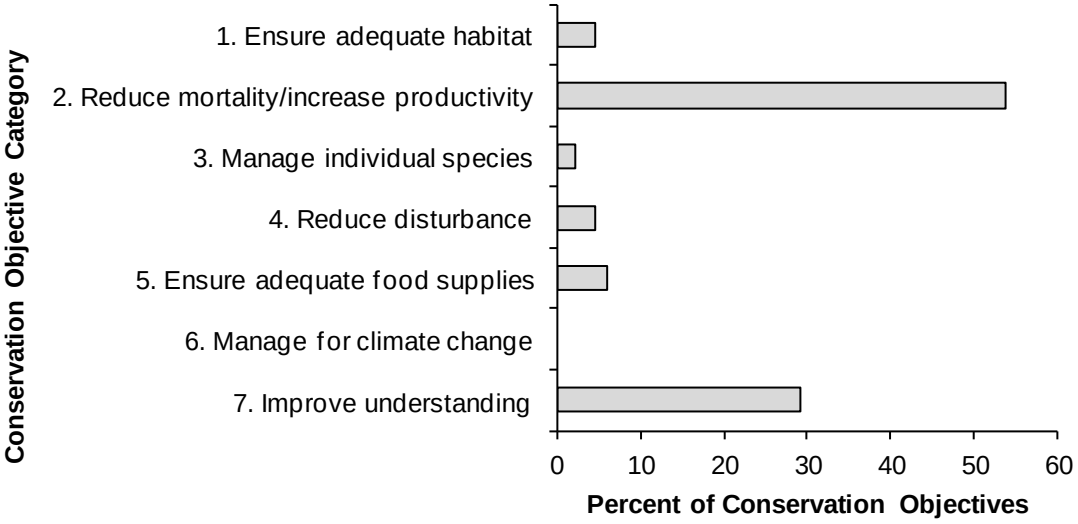


Figure 15. Percent of all conservation objectives assigned to each conservation objective category in MBU 12 NL.

Note: Widespread issues (including climate change) were excluded from this calculation, as these are detailed in Section 3 of the full strategy.

Element 6: Recommended Actions

Recommended actions indicate on-the-ground activities that will help to achieve the conservation objectives (Figs. 16, 17 and 18). Actions are strategic rather than highly detailed and prescriptive. Whenever possible, recommended actions benefit multiple species and/or respond to more than one threat. Recommended actions defer to or support those provided in recovery documents for species at risk at the federal, provincial or territorial level, but will usually be more general than those developed for individual species.

The recommended conservation actions are classified following the categories developed by the World Conservation Union-Conservation Measures Partnership (IUCN-CMP), with the addition of categories for research and monitoring. In BCR 8 NL, the most frequently recommended conservation actions were not assigned to a sub-category, as they were related to widespread issues such as climate change and a lack of information. The most frequently identified conservation actions for direct threats were listed under the sub-categories 2.1 Site/area management and 5.3 Private sector standards and codes (Fig. 16). Examples of actions under site or area management include specific recommendations to establish buffer zones around known breeding, foraging and/or staging areas in and around several habitats and limit industrial activities within these established buffers; limit human recreational activities in important breeding colony and stopover areas during breeding and migration windows; limit sources of loud noise and rapidly moving vehicles in sensitive areas during breeding and migration windows; as well as maintain sufficient patch sizes, configuration and connectivity of habitats to support and, where necessary, enhance populations of priority species. Examples of private sector standards and codes include the development of beneficial management practices for bridge maintenance crews to benefit priority species; use pesticides and other biocides only where necessary and only as part of an integrated pest management system to minimize exposure of birds to potentially toxic chemicals; as well as manage for tree species and age diversity, structural diversity and important habitat features.

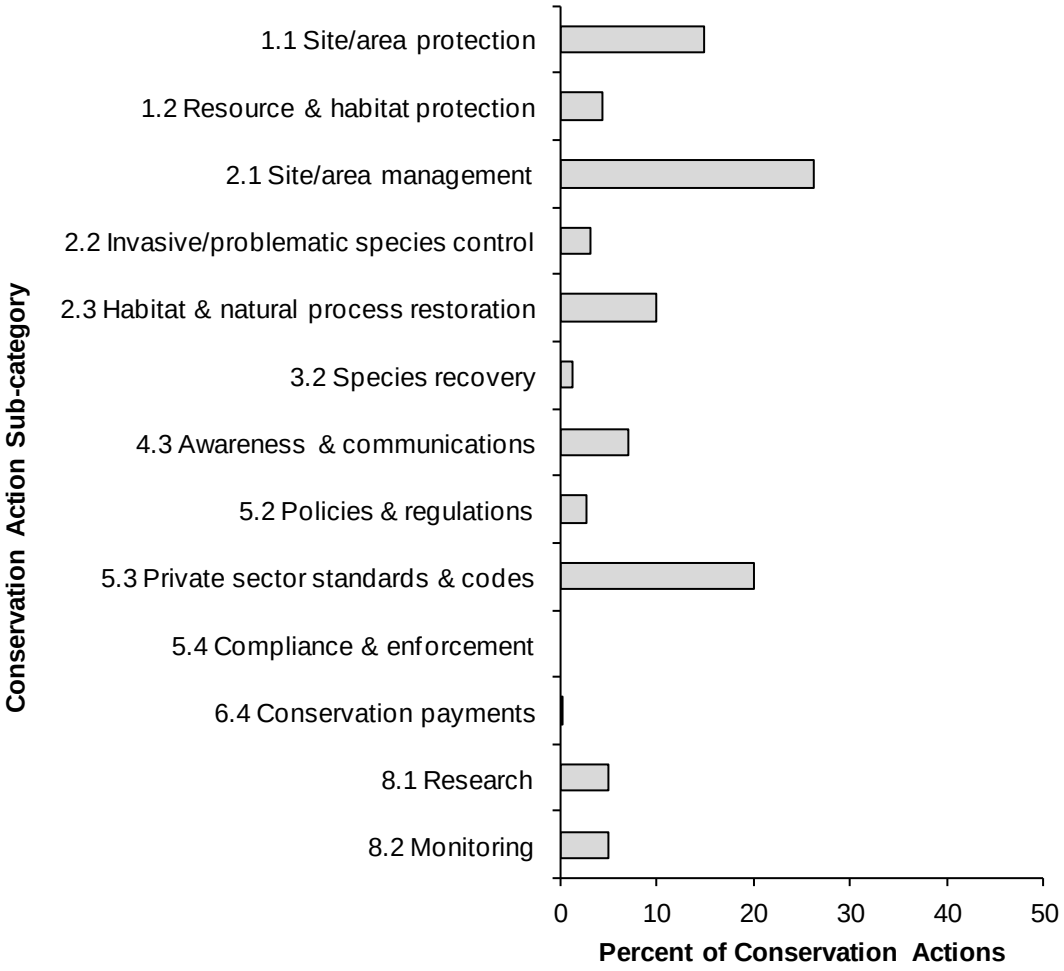


Figure 16. Percent of recommended conservation actions assigned to each sub-category in BCR 8 NL.
Note: 8.1 Research and 8.2 Monitoring sub-categories refer to specific species where additional information is required. For a discussion of broad-scale research and monitoring requirements, see Research and Population Monitoring Needs in Section 3 of the full strategy. For information on threats related to widespread issues (e.g., climate change), see Widespread Issues, also in Section 3.

In MBU 10 NL and MBU 12 NL, the most frequently identified conservation actions were listed under the sub-categories 2.3 Habitat and natural process restoration and 5.2 Policies and regulations. Examples of actions under the former are to maintain/restore or improve water quality in marine waters by reducing the use of pollutants or heavy metals leaching into the environment, maintain/improve effectiveness of emergency intervention programs such as those run by the Regional Environmental Emergencies, maintain/improve Environment Canada's Birds Oiled at Sea (BOAS) program, and to recover and dispose of derelict fishing gear or garbage and solid wastes in marine waters and coastal (intertidal) habitats. Examples of policies and regulations include making, implementing, changing, influencing or providing input into policies and regulations affecting the implementation of laws at international, national, state/provincial, local and tribal levels. For example, altering fishing practices to avoid important foraging/staging areas during periods of peak bird use, regulating the adoption of

fishing gear modifications to reduce bycatch as a condition of licensing, and prohibiting disposal of garbage and solid wastes in marine waters or coastal (intertidal) habitats through regulation.

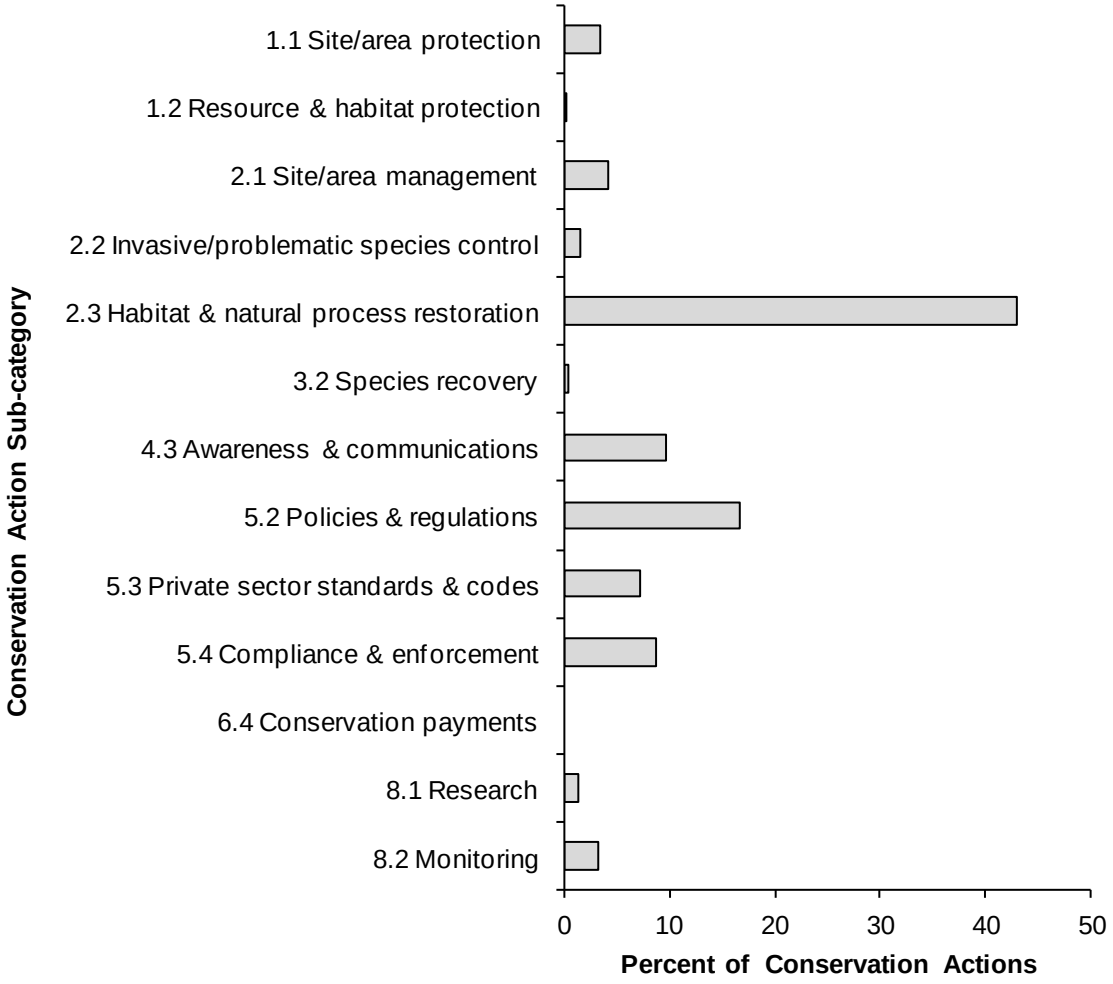


Figure 17. Percent of recommended conservation actions assigned to each sub-category in MBU 10 NL.
Note: 8.1 Research and 8.2 Monitoring sub-categories refer to specific species where additional information is required. For a discussion of broad-scale research and monitoring requirements, see Research and Population Monitoring Needs in Section 3 of the full strategy. For information on threats related to widespread issues (e.g., climate change), see Widespread Issues, also in Section 3.

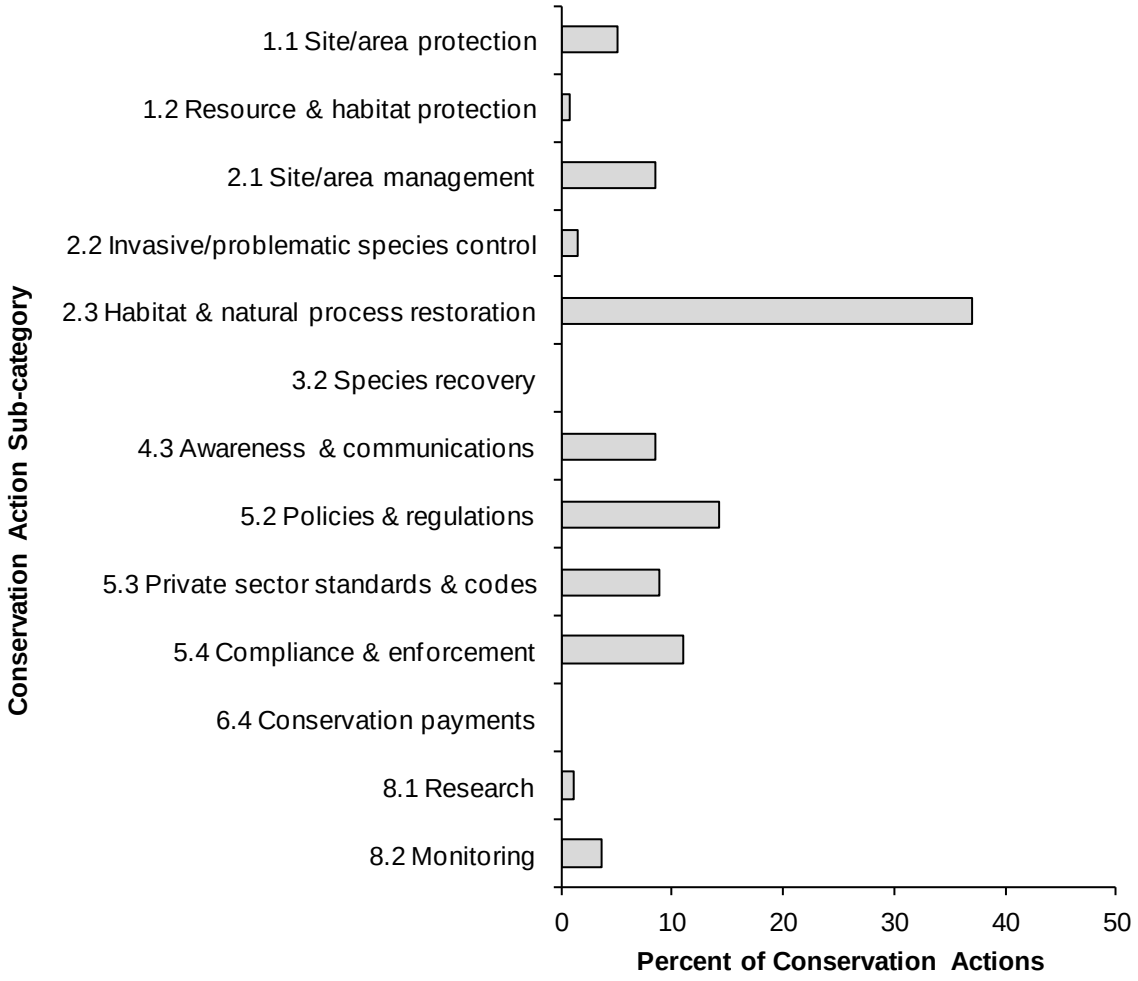


Figure 18. Percent of recommended conservation actions assigned to each sub-category in MBU 12 NL.
Note: 8.1 Research and 8.2 Monitoring sub-categories refer to specific species where additional information is required. For a discussion of broad-scale research and monitoring requirements, see Research and Population Monitoring Needs in Section 3 of the full strategy. For information on threats related to widespread issues (e.g., climate change), see Widespread Issues, also in Section 3.

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