Northern Prairie and Parkland
Waterbird Conservation Plan

Shorebird Conservation for the Americas

Prairie Pothole
JOINT VENTURE

prairie habitat
joint venture

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Table of Contents

Executive Summary

The Northern Prairie and Parkland Region (NP&PR) contains millions of wetland basins that harbor large proportions of the populations of many North American waterbird species. However, knowledge of waterbirds in the NP&PR is limited, and there has been little direction for waterbird conservation planning or management. Canadian and U.S. partners developed the Northern Prairie and Parkland Waterbird Conservation Plan under the auspices of the North American Waterbird Conservation Plan to provide an overview of the status and current knowledge of waterbirds and waterbird habitat in the Region and to outline strategies and priorities for monitoring, research, and management.

Much wetland and upland habitat in the NP&PR has been lost or degraded, primarily due to agriculture. Consequently, populations of many species of waterbirds are considered at risk. Least Tern and Whooping Crane are listed as endangered species and the Least Bittern is listed as threatened in portions of the NP&PR, and the plan identifies Western Grebe, Franklin's Gull, Black Tern, Horned Grebe, American Bittern, Yellow Rail, and King Rail as species of high concern.

Highest priority conservation issues affecting waterbirds in the NP&PR are:

- Loss and degradation of wetland habitats, which directly affects all waterbird species throughout the NP&PR.
- Loss and degradation of upland habitats surrounding wetlands, which directly affects most waterbird species throughout the NP&PR.

Retention and development of wildlife-friendly agriculture programs (e.g., "Swampbuster" provision in U.S. Farm Bill) will have a major impact on waterbird conservation in the NP&PR by helping preserve the existing wetland and upland habitat base. Specifically addressing waterbird conservation issues in the NP&PR necessitates that limited resources directed toward waterbird conservation are strategically applied, which will require considerable knowledge of waterbird ecology that is presently lacking. Reliable, comprehensive population information that incorporates wetland availability and landscape context is the foremost information need. Specific priority research and information needs include:

- Accurate distribution, abundance, and population trend data for all species, particularly non-colonial waterbirds.
- An understanding of habitat requirements at local and landscape levels for all waterbirds with emphasis on priority species.
- An understanding of factors affecting survival and productivity.
- Establishing and evaluating standard protocols for surveys, especially in relation to regional issues and local challenges.
- An understanding of the impacts of diseases on waterbirds.
- An understanding of the influence of environmental conditions, particularly water conditions, on dispersal and population shifts.
- An understanding of the relative role of breeding, staging, and wintering grounds on waterbird populations (e.g., knowing where conservation bottlenecks are and who will address them). These issues will need to be addressed at a broader scale than the NP&PR

Waterbird Conservation Plan.

- A knowledge of the response of different waterbirds to various management treatments.
- An expanded spatial context for waterbirds, e.g., how they respond to natural and human-induced environmental changes, and how changing waterbird populations—especially new, large colonies of gulls—affect other species, particularly shorebirds.

The plan recommends a landscape approach to help integrate conservation planning for waterbirds with conservation planning for other species, particularly extensive waterfowl conservation efforts in the NP&PR. The purpose of the plan was to provide an overview and outline priorities and strategies; implementation of the plan is an additional step that will need to be undertaken by partners within the NP&PR. Key recommendations for implementation of the plan include:

- Initiation of standardized, region-wide surveys for colonial and non-colonial species.
- Development of statistically sound, defensible estimates of distribution, abundance, and population trends for all waterbird species in the NP&PR.
- Understanding habitat requirements at local and landscape levels for all waterbirds.
- Development of NP&PR-wide spatially explicit habitat models for waterbirds.
- Completion of NP&PR-wide wetland inventory.
- Completion of NP&PR-wide upland habitat inventory, to be updated at regular intervals.
- Development of a standardized, readily accessible database in which to store population survey data.
- Above all, conservation of habitat for priority species identified through the tools and tasks listed above.

The plan is supported by the Prairie Habitat Joint Venture in Canada and the Prairie Pothole Joint Venture in the U.S. The plan will be coordinated and implemented by the U.S. Fish and Wildlife Service, Canadian Wildlife Service, and the respective joint ventures. Effective waterbird conservation in the NP&PR will require a shift in focus of federal agriculture programs as well as significant programs and funding specifically directed at waterbirds.

Acknowledgments

A large number of people from a variety of agencies and organizations in the U.S. and Canada contributed to this plan. We thank everyone for their support, and ask that they help continue waterbird conservation in the Northern Prairie & Parkland Region by updating information, monitoring birds, and working to conserve habitat. The Prairie Pothole Joint Venture and the Prairie Habitat Joint Venture supported the development, publication, and distribution of the plan. In Canada, the Waterbird Working Group moved the development of the plan forward through their active participation. The Prairie Canada Shorebird Conservation Plan provided the initial framework, design, and some of the background material from which the Northern Prairie & Parkland Waterbird Conservation Plan was developed. The plan has been reviewed and endorsed by the Regional Planning and Implementation Committee of the North American Waterbird Council.

Many people gave generously of their time to write species accounts and other sections of the plan, provide information on key sites, or review early drafts of the plan, including Kristine Askerooth, Dave Azure, Mairi Babey, Doug Backlund, Michael Barr, Richard Bishop, Natoma Buskness, John Carlson, Bill Chappell, Cal Cuthbert, Charles Deschamps, Ken DeSmet, Dave Duncan, Kathy Duttenhefner, Loney Dickson, John Dunlop, Bonita Eliason, Mike Estey, Eileen Dowd-Stukel, Steve Fairbairn, Suzanne Fellows, Frank Fraser, Todd Grant, Lisa Gelvin-Innvaer, Bev Gingras, Mike Gollop, Kelly Graham, Diane Granfors, Todd Grant, Jason Greenall, Sandra Hagen, Barb Hanbidge, Jim Hansen, Stephen Hanus, Katie Haws, Mark Heckbert, Laura Hubers, Gary Huschle, Stephanie Jones, Rob Kaye, Jeff Keith, Tim Kessler, Gregg Knutsen, Stan Kohn, Colleen Kolbeck, William Koonz, Rachel Laubhan, Steve Lewis, Carol Lively, Tom Maccagno, Beth Madden, Ron Martin, Kurt Mazur, David McKenna, Glen McMaster, Will Meeks, Doug Mosser, George Newton, Gary Nuechterlein, Katharine Parsons, Fritz Prellwitz, Dave Prescott, Margo Pybus, Chuck Pyle, Wayne Renaud, Ron Reynolds, Kory Richardson, Keith Roney, Ronnie Sanchez, John Sauer, Paulette Scherr, Bill Schultze, Michael Semenchuk, Jill Shaffer, Karen Smith, Mary Soler, Dan Svingen, Peter Taylor, Phil Taylor, Drajs Vujnovic, Jennifer Wheeler, Ted Wiens, Steve Wilds, Alex Wilke, and Jim Zohrer. The significant efforts of Kevin Hannah, Karla Guyn, Carol Lively, Ron Reynolds, Tom Sadler, Jill Shaffer, Alan Smith, and Jennifer Wheeler are particularly appreciated. Thank you to Martin Schmoll, who produced all the maps for the species accounts. Special thanks are also due to the Alberta Natural Heritage Information Centre, Saskatchewan Conservation Data Centre, and Manitoba Conservation Data Centre, as well as the Northern Prairie Wildlife Research Center, which is hosting the waterbird bibliography on its web site. We thank everyone who contributed and extend our apologies to anyone we inadvertently omitted from this list.

Cover photograph of Black Tern © G.W. Beyersbergen

1.0 Introduction

1.1 Goals and Objectives

The North American Waterbird Conservation Plan (www.waterbirdconservation.org) was developed to provide a continental perspective on the status of and conservation efforts for waterbirds in North America. Regional plans, based on assemblages of Bird Conservation Regions (BCRs) called Waterbird Conservation Regions, focus on regional issues for waterbird conservation. The Northern Prairie & Parkland Waterbird Conservation Plan (NPPWCP) is a joint Canada/United States venture that describes the current knowledge, biology and conservation efforts for 40 waterbird species in the Northern Prairie & Parkland Region (NP&PR).

The overall goal of this conservation plan is

> "To provide guidelines for conservation that, when implemented, result in maintaining and managing healthy populations, distributions, and habitats of waterbirds throughout the Northern Prairie & Parkland Region of North America."

To successfully achieve the goals of the NPPWCP, a number of actions will be required, including:

- Acquiring sufficient information about the population dynamics, population trends, breeding, migration and staging strategies, and habitat preferences of waterbirds in the NP&PR to make knowledgeable management recommendations;
- Conserving and enhancing sufficient high-quality habitat to support healthy populations of waterbirds in the region;
- Informing the public, decision-makers, and all those involved in land management in the NP&PR about the importance of the Region to waterbirds, and about the biology, trends, and management of waterbird species; and
- Ensuring that coordinated conservation efforts (regional, national, and international) are in place to address the key conservation priorities of waterbirds in the NP&PR.

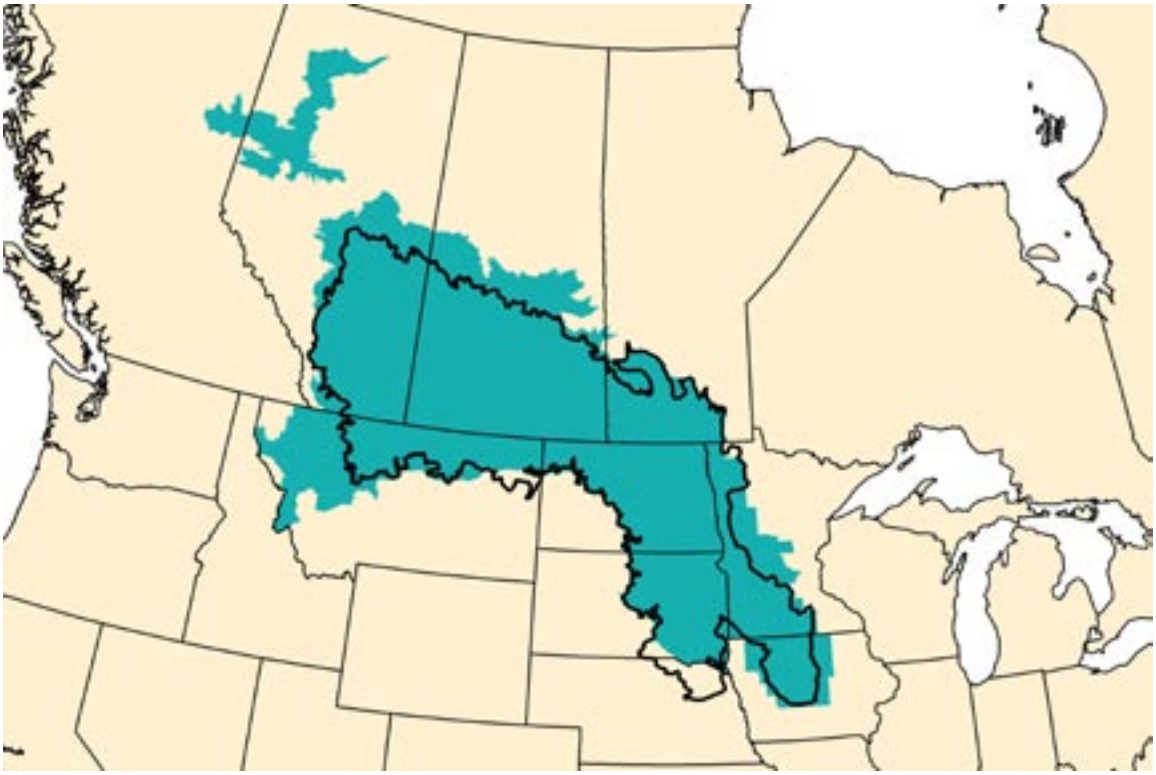
This document will:

- Assess the importance of the NP&PR to waterbirds;
- Describe current knowledge on population sizes and trends, habitat requirements, distributions, and key sites for each species of waterbird present in the region;
- Identify conservation issues for each of the species;
- Prepare a conservation status assessment for each species based on regional biological information, conservation issues, and continental ranking schemes;
- Provide guidance on conservation and management strategies that provide on-the-ground benefits to waterbirds;
- Provide direction for integrated, landscape-level waterbird conservation that considers and incorporates conservation planning for other species;
- Suggest high priority information gaps that must be filled to increase our ability to successfully manage waterbird species, and indicate related research questions that need to be addressed;

- Recognize the importance of staging and wintering areas in other regions to waterbirds that breed in the NP&PR;
- Provide information on key programs and funding sources that can provide resources for waterbird conservation; and
- Provide a reference listing of existing management plans relevant to species in the region; a separate bibliography with a listing of publications relevant to waterbirds in the region is available at www.npwrc.usgs.gov/resource/literatr/wbirdbib/wbirdbib.htm. Current publications can be found through literature databases such as Wildlife Worldwide, which is available online and to which all USFWS employees are subscribed.

The NP&PR consists of those areas covered by the Prairie Pothole Joint Venture (PPJV) in the United States and the Prairie Habitat Joint Venture (PHJV) in Canada (Figure 1). The PPJV and PHJV are regional, cooperative entities established under the North American Waterfowl Management Plan. Originally developed for planning and implementation of waterfowl conservation, the joint ventures have expanded to include integrated bird conservation. Integration and implementation of the NP&PR Waterbird Conservation Plan will take place under the auspices of the PPJV and PHJV. Those portions of Nebraska in BCR 11 will be included in Nebraska's all-bird conservation plan.

Figure 1. Location of the Northern Prairie & Parkland Waterbird Conservation Region (dark shaded areas) and Bird Conservation Region 11 (black outline) in north-central North America.



The purpose of this plan is to provide a foundation for regional, integrated waterbird conservation planning; it will not supplant or replace existing plans that have been developed for rare or harvested species.

Citations are not provided in the text of this document, but a list of references used in development of the plan is provided in Section 7.

1.2 Species Covered by the Plan

Waterbirds are a taxonomically and morphologically diverse group of birds that are closely tied to water bodies for a substantial portion of their life history. The group includes members of 8 orders and 22 families of birds in North America. Thirty-nine species of waterbirds breed in the NP&PR and are included in this plan. Many other species (Appendix A) occur in the NP&PR as migrants or vagrants; of these, only one species, the Whooping Crane, is included in the plan because it is an endangered species and consistently occurs in the NP&PR during migration. The 40 species covered in the NPPWCP include:

- loons (Gaviidae; 1 species)
- grebes (Podicipedidae; 6 species)
- pelicans (Pelecanidae; 1 species)
- cormorants (Phalacrocoracidae; 1 species)
- herons, night-herons, bitterns, and egrets (Ardeidae; 11 species)
- ibises (Threskiornithidae; 1 species)
- rails, coots and moorhens (Rallidae; 7 species)
- cranes (Gruidae; 2 species)
- gulls and terns (Laridae; 10 species)

Some of our most recognizable birds, such as the American White Pelican, are included in this group, as are some of our least known and inconspicuous species, such as the Yellow Rail. Some species breed in large colonies, with tens of thousands of birds packed onto a small island during the spring and summer, whereas others breed solitarily. The varied members of the group use nearly every type of wetland habitat available, from large, deep lakes to ephemeral, shallow marshes.

Throughout this plan, the full suite of 40 species (Table 1) is considered under each topic heading in the interest of promoting integrated conservation approaches and solutions. As mentioned, only one migrant, the Whooping Crane, is specifically addressed in the plan. Breeding species are further grouped as colonial breeders or non-colonial breeders. The degree of coloniality varies, but in the plan 24 species are considered colonial breeders and 15 are considered non-colonial breeders. Many of the non-colonial breeders are sometimes referred to as marshbirds, although some colonial species nest in marshes. Terms are defined in the Glossary; waterbird species that occur infrequently in the NP&PR and are considered accidental or vagrants are listed in Appendix A. Shorebirds and waterfowl are not addressed in this plan. Regional plans for shorebirds have been developed under the U.S. and Canadian shorebird plans, and plans for waterfowl have been developed under the North American Waterfowl Management Plan.

Table 1. Waterbird species included in the Northern Prairie & Parkland Waterbird Conservation Plan. All species breed in the NP&PR except Whooping Crane.

Common Name	Scientific Name	Colonial [C] Non-colonial [N]	Breeding Distribution
Common Loon	*Gavia immer*	N	Widespread
Pied-billed Grebe	*Podilymbus podiceps*	N	Widespread
Horned Grebe	*Podiceps auritus*	N/C*	Widespread
Red-necked Grebe	*Podiceps grisegena*	N/C	Widespread
Eared Grebe	*Podiceps nigricollis*	C/N	Widespread
Western Grebe	*Aechmophorus occidentalis*	C	Widespread
Clark's Grebe	*Aechmophorus clarkii*	C	Local
American White Pelican	*Pelecanus erythrorhynchos*	C	Widespread
Double-crested Cormorant	*Phalacrocorax auritus*	C	Widespread
American Bittern	*Botaurus lentiginosus*	N	Widespread
Least Bittern	*Ixobrychus exilis*	N/C	Widespread
Great Blue Heron	*Ardea herodias*	C	Widespread
Great Egret	*Ardea alba*	C	Peripheral
Snowy Egret	*Egretta thula*	C	Peripheral
Cattle Egret	*Bubulcus ibis*	C	Local
Little Blue Heron	*Egretta caerulea*	C	Peripheral
Tricolored Heron	*Egretta tricolor*	C	Peripheral
Green Heron	*Butorides virescens*	N/C	Widespread
Black-crowned Night-Heron	*Nycticorax nycticorax*	C	Widespread
Yellow-crowned Night-Heron	*Nyctanassa violacea*	C	Peripheral
White-faced Ibis	*Plegadis chihi*	C	Local
Yellow Rail	*Coturnicops noveboracenis*	N	Widespread
Black Rail	*Laterallus jamaicensis*	N	Peripheral
King Rail	*Rallus elegans*	N	Widespread
Virginia Rail	*Rallus limicola*	N	Widespread
Sora	*Porzana carolina*	N	Widespread
Common Moorhen	*Gallinula chloropus*	N	Peripheral
American Coot	*Fulica americana*	N	Widespread
Sandhill Crane	*Grus canadensis*	N	Widespread
Whooping Crane	*Grus americana*	N	Non-breeding
Franklin's Gull	*Larus pipixcan*	C	Widespread
Bonaparte's Gull	*Larus philadelphia*	C/N	Peripheral
Ring-billed Gull	*Larus delawarensis*	C	Widespread
California Gull	*Larus californicus*	C	Widespread
Herring Gull	*Larus argentatus*	C	Peripheral
Caspian Tern	*Sterna caspia*	C	Local
Common Tern	*Sterna hirundo*	C	Widespread
Forster's Tern	*Sterna forsteri*	C	Widespread
Least Tern	*Sterna antillarum*	C/N	Local
Black Tern	*Chlidonias niger*	C	Widespread

*N/C: degree of coloniality varies; most typical behavior is listed first.

1.3 A Continental Perspective on the Northern Prairie & Parkland Region

1.3.i Physical Geography of the Northern Prairie & Parkland Region

The NP&PR covers 1,197,000 km^2 in two disjunct units. The primary unit arcs southeast from the boreal transition zone in central Alberta to central Iowa, bounded on the south and west by the Missouri River (Figure 1). The second unit in the NP&PR is the Peace Parkland, located on the east-central edge of British Columbia and northwestern Alberta. Landscapes in the planning region include prairie potholes, aspen parklands, northern grasslands, and the boreal transition zone. Other plans or documents may refer to the region covered in this document as BCR 11 or the Prairie Pothole Region (PPR). The boundaries of the planning region covered in this document differ somewhat from those of BCR 11 or the PPR (Figure 1), so the area covered under this plan is referred to as the Northern Prairie & Parkland Region and the document is referred to as the Northern Prairie & Parkland Waterbird Conservation Plan. The boundary of the NP&PR is synonymous with the boundaries of the Prairie Pothole and Prairie Habitat joint ventures, and includes most of BCR 11, as well as portions of BCRs 6 and 10 (see www.nabci-us.org/map.html for more information on BCRs).

As the glaciers receded from this part of the continent approximately 10,000 years ago, they left behind small depressions in the landscape created by the melting of ice blocks and deposition of glacial debris. These "potholes" contain a variety of small wetlands ranging from wet meadows and shallow water ponds to saline lakes, marshes, and fens. The density of wetlands in the region may be as high as 60/km^2 (155/$mile^2$); most of these wetlands are small, < 0.5 ha (1 acre) in size. In some areas, reservoirs have been created by damming streams and rivers. The region is also dotted with oxbow wetlands created from the changing flow of rivers and streams.

The dominant native vegetative community of the NP&PR is prairie, followed by woodlands and wetlands. Mixed-grass prairies are dominant in most of the region, although the northern and western fringes include fescue grasslands and the southeastern portion includes tallgrass prairie. Boreal transition forest and aspen parklands extend from the northern boundary in a belt 100-200 km to the south.

European settlement has greatly transformed the region. Extensive cultivation has reduced the tallgrass prairie by about 99 percent, the mixed-grass prairie by approximately 80 percent, and the number of wetlands by up to 50 percent. Suppression of prairie fires and the extirpation of bison have resulted in a marked increase in woody cover in some areas.

1.3.ii Ecological Importance of the Northern Prairie & Parkland Region

The NP&PR has been identified as the most important waterfowl production area in North America. The myriad wetlands that make the NP&PR valuable to waterfowl also make it valuable to a host of other species, especially waterbirds. In North Dakota alone, at least 63 species of birds are wetland associates. Many species of waterbirds reach their highest densities or are found primarily in the NP&PR. Although population data for waterbirds are often lacking, distributional data show the NP&PR to be especially important for Eared Grebe, American White

Pelican, Franklin's Gull, California Gull, Forster's Tern, and Black Tern. In addition, wetland margins and dense upland vegetation surrounding wetlands provide habitat for a variety of upland species and provide nesting cover for many wetland-dependent birds. During droughts, dry wetlands provide cover for upland and wetland-edge birds, while typical waterbird species may be absent. In addition to birds, prairie potholes also provide habitat for many game and non-game mammals, fish, reptiles, and amphibians. Less visible are aquatic invertebrates, which provide a protein-rich diet for juveniles and adults of many species of waterbirds.

Prairie wetlands provide habitat for a host of wildlife species and perform a variety of ecological functions, including water retention and flood control, sediment and nutrient retention, water filtration, and ground water recharge. Undisturbed wetlands typically function as carbon sinks, although the amount of carbon is small relative to the net primary productivity of wetlands. The ecological functioning of wetlands, particularly production, nutrient retention, and nutrient release, is influenced by changes in water level, which are primarily driven by precipitation.

The ecological importance of the NP&PR goes beyond wetlands. Grasslands are considered North America's most endangered ecosystem, and even though the NP&PR has lost a lot of grassland due to agricultural development, much grassland remains relative to most regions of North America. The NP&PR harbors many species of grassland birds, some of which are rare or declining, such as Sprague's Pipit and Baird's Sparrow. Grasslands in the NP&PR complement wetlands, as many species of wetland birds nest in surrounding uplands. In addition, grasslands increase water retention, filter water entering wetlands, and retain large amounts of nutrients and carbon. Because inputs from uplands readily enter wetlands, managing surrounding landscapes is key to managing wetlands. This may be especially true in areas of the NP&PR where wetlands are widely distributed throughout a predominantly agricultural landscape. Even the simple presence of grass buffers around wetlands can have a significant impact on a wetland's water quality and suitability for wetland-dependent wildlife.

1.3.iii Threats to the Ecological Integrity of the Northern Prairie & Parkland Region

Many species and ecological functions are being lost in the NP&PR as native habitat is altered or converted to other uses. Because agriculture is the primary land use, many of the threats to the ecological integrity of the NP&PR are related to agricultural practices and programs. Threats can be direct, as in habitat loss from wetland drainage and conversion of grassland to cropland, or indirect, such as pesticide-induced loss of invertebrate populations necessary for growth and survival of birds.

Vast numbers of wetlands already have been converted to other uses in the NP&PR. Statewide estimates of number of wetlands lost are 89% for Iowa, 49% for North Dakota, 42% for Minnesota, 35% for South Dakota, and 27% for Montana. The percentage of surface area lost is smaller than the percentage of number of wetlands, as smaller wetlands, which are easier to drain, are drained first. However, small wetlands are disproportionately used by breeding waterfowl, and loss of small wetlands can disrupt habitat connectivity and reduce diversity and function of wetland complexes. Estimates of wetland loss for the Canadian prairie/parkland regions from 1985 to1999 are 4.9% for Manitoba, 4.4% for Alberta, and 3.0% for Saskatchewan (M. Watmough, pers. comm.).

The strength of the agricultural economy influences incentives to convert native habitat to crop fields, as grassland and wetland conversion increase when crop prices are high. However, agriculture can have a tremendous impact on land use even in the absence of direct market forces. For example, the U.S. Department of Agriculture's Conservation Reserve Program (CRP), which takes land out of production by paying farmers to plant grass on croplands for a contracted time period, paid farmers in North Dakota approximately $100 million per year during the late 1990s. Wetlands in the U.S. presently receive some protection under the Swampbuster provision of the *Food Security Act of 1990* (a.k.a. Farm Bill), which denies federal agricultural benefits to farmers who drain wetlands, although wetlands can be farmed in dry years. Important as Swampbuster is to wetland-dependent wildlife, protection under the Swampbuster provision is temporary, and may be lost as new farm bill legislation is enacted. Wetland protection also may be jeopardized by other government regulations and decisions. For example, the U.S. Supreme Court ruled that isolated, non-navigable, intrastate wetlands (such as those typical of the NP&PR) are no longer protected under Section 404 of the *Clean Water Act of 1972*, which prohibits the dredging or filling of any portion of the waters of the United States without a permit.

Canadian wetlands are afforded protection on federal and provincial "crown" lands under a variety of federal and provincial wetland policies, along with relevant acts and regulations. Outside these areas, wetland protection for larger water bodies falls under federal legislation such as the *Fisheries Act* and the *Navigable Waters Protection Act*. Wetland drainage on private lands is regulated, but not stopped, by permitting procedures covered under water acts in Alberta (*The Water Act*), Saskatchewan (*The Water Corporation Act*), and Manitoba (*The Water Rights Act*).

Wetlands can be degraded even if they are not drained, as cultivation of wetland basins during dry years may reduce quality of wetland habitat during subsequent wet years when basins hold water. Marsh plants can survive several years of cultivation, but tillage of basins over extended periods can alter wetland plant community composition and reduce structure of wetland vegetation. In addition, wetlands in agricultural fields may have reduced numbers of invertebrates relative to wetlands in grasslands. Agriculture also has many less obvious, indirect effects that threaten the ecological integrity of the NP&PR, including siltation and fertilizer and herbicide inputs. Pesticides can decrease reproductive success as well as cause direct and indirect mortality of birds. Declines in populations of piscivorous raptors during the DDT era are well documented, along with declines of some waterbirds, but it is likely that smaller, less visible waterbirds also were impacted, although the extent of any decline is unknown. Other pesticides such as carbofuran, chlorpyrifos, and parathion can cause direct mortality of birds, kill invertebrates upon which many waterbirds feed, and contaminate food resources.

Many non-agricultural threats to wetlands also exist. Increased burning of fossil fuels, particularly at coal-fired generating plants, causes acidification of precipitation, which has led to reduced productivity of some wetlands. Human-induced climate change (i.e., "global warming"), if it does occur, has the potential to alter temperature, precipitation amounts and patterns, growing season, plant evapo-transpiration, and a host of related factors such as snow cover, timing of migration, timing and duration of dormancy, species composition of native and agricultural systems, and urbanization, all of which could have dramatic impacts on many

aspects of ecology in the NP&PR. Exotic species are spreading within the region, including terrestrial species such as leafy spurge and spotted knapweed and wetland/riparian species such as purple loosestrife and salt cedar. Many ecosystem functions are lost or altered as native species are displaced, alien species invade, and natural disturbances such as grazing and fire are altered.

1.4 Waterbird Conservation in the Northern Prairie & Parkland Region

1.4.i History and Legal Framework

Uncontrolled commercial hunting for the food and feather trade in the late 1800s and early 1900s decimated many North American waterbird species. Although Canada had established bird refuges as early as 1887, the first protection undertaken specifically for waterbirds in North America was the 1903 designation of Pelican Island National Wildlife Refuge in Florida, which was established to protect nesting egrets and Brown Pelicans. Canada took a big step forward in May 1915 when 12 Saskatchewan lakes (Basin, Bigstick, Bitter, Cabri, Chaplin, Crane, Goose, Johnstone [Old Wives], Lenore, Quill, Redberry and White Bear) and 14 Alberta lakes (Big Hay, Birch, Buffalo, Cooking, Gaskell, Grease Wood, Lac la Biche, Lac Ste. Anne, Many Island, Ministik, Miquelon, Moose Head, Pakowki and Wabamum) were protected. Many of these lakes were established as Federal Migratory Bird Sanctuaries by 1925 (although some were later delisted) and by these acts many of the most important breeding lakes for colonial waterbirds in Prairie Canada were protected. As in Canada, most National Wildlife Refuges in the United States portion of the NP&PR were acquired to provide breeding or migration habitat for waterfowl, but some refuges were acquired specifically to protect waterbirds such as American White Pelicans, and virtually all refuges harbor multiple species of waterbirds.

In 1913 the *Weeks-McLean Act* (also referred to as the *Migratory Bird Act of 1913*) was passed in the United States, which declared that migratory and insectivorous birds were under the jurisdiction of the federal government. The *Weeks-McLean Act* was later struck down, but became the basis for the *Migratory Bird Treaty Act* (MBTA, known as the *Migratory Birds Convention Act* in Canada) between Canada and the United States, which was signed in Washington on August 16, 1916. This was ratified in the U.S. later that same year and in Canada in 1917; regulations under the MBTA took effect continent-wide in 1918. This act closed the hunting season on Sandhill Cranes (until 1961 when a hunting season resumed in 8 Central Flyway states and in 1964 in Manitoba and Saskatchewan) and regulated hunting seasons for waterfowl, American Coots, Common Moorhens, and rails. Double-crested Cormorants and American White Pelicans were not initially covered under the MBTA, as they were deemed a potential threat to fisheries. It was not until 1978 and 1982 that most breeding colonies of American White Pelicans and Double-crested Cormorants were protected across Prairie Canada. In Canada, all waterbirds are covered by the MBCA except for American White Pelicans and Double-crested Cormorants, which come under provincial jurisdictions. In the United States, pelicans and cormorants were given federal protection in a 1972 addendum to the 1936 *Migratory Bird Treaty Act* with Mexico. The *Endangered Species Act* (1973) in the United States and the *Species At Risk Act* (2003) in Canada provide protection and recovery planning for endangered species or species at risk, including several waterbird species in the NP&PR.

Conservation of waterbird habitat in the United States was enacted through legislative protection of wetlands under Section 404 of the *Clean Water Act* of 1972. Section 404 slowed, but did not eliminate, wetland losses in the United States. Unfortunately, in 2001 the Supreme Court of the United States ruled that isolated, non-navigable, intrastate wetlands (such as those typical of the NP&PR) were no longer protected. The final outcome of this ruling is not clear, though, as it is subject to interpretation and application of regulations and guidelines. Wetlands may still be protected under state laws or federal programs such as *The Food Security Act* of 1985. The objective of Canada's *Federal Policy on Wetland Conservation: 1991*, applicable to federal lands, is "to promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future." Canada's *Prairie Farm Rehabilitation Act* (PFRA) of 1935 (www.agr.gc.ca/pfra/main_e.htm) was established to rehabilitate areas of Prairie Canada decimated during the drought of the 1930s. Although not targeted at wetlands and waterbirds, the general rehabilitation and management of the landscape for agriculture, primarily cattle grazing, has conserved wetlands and native grassland, which benefits waterbirds and other wildlife.

1.4.ii Existing Monitoring and Research

Waterbird monitoring in the NP&PR has taken place under a multitude of programs, time frames, and formats. This section is not comprehensive and does not include local or short-term programs (see Appendix B) but provides information on several broad-scale efforts.

The National Colonial Bird Register at Cornell University was an attempt to create a comprehensive, long-term database documenting numbers of waterbirds at colonies throughout the United States and portions of Canada. The Register provided a repository for detailed data, but records were included opportunistically with no mechanism or funding for sampling, and the National Audubon Society terminated support of the National Colonial Bird Register in the late 1980s. Since then, there has been no comprehensive program to specifically monitor waterbirds in the NP&PR, although some states and provinces maintain records of waterbird colonies in natural heritage programs, provincial conservation data centers, or state databases similar to the Cornell Registry. Less information is available regarding populations and locations of non-colonial waterbirds, with the exception of American Coot, which is monitored because it is a game species.

The North American Breeding Bird Survey (BBS) presently has 326 routes in the NP&PR: 208 in Canada (87 in Alberta, 62 in Saskatchewan, 59 in Manitoba) and 118 in the United States (28 in Montana, 31 in North Dakota, 21 in South Dakota, 29 in Minnesota, and 9 in Iowa). BBS data, collected in June, provide useful information on distribution, relative abundance, and population trends of many bird species. However, not all routes are surveyed every year. In addition, routes must be surveyed at least twice by a single observer to be included in population trend analyses. Thus, the number of routes available for calculation of species' trends may be lower than the total number of registered routes. However, it is not known how accurate this method is for monitoring waterbirds that are seldom seen or heard during nesting or any part of their summer residency, especially as BBS routes do not target wetlands. In the Canadian prairies, an intensification of survey effort to complement the

BBS is being undertaken through the Grassland Bird Monitoring (GBM) program, which also samples waterbirds.

Breeding Ground Surveys for waterfowl are conducted cooperatively between the United States and Canada during the month of May to estimate populations of waterfowl and American Coot. These surveys consist of an aerial component and a ground component that surveys a sub-sample of ground segments within the aerial transects. Large wetlands are avoided in the ground segments. These surveys have been run annually since 1955. However, a new set of transects was established and old ones were dropped in the Canadian prairies in 1975, and the number of transects was further expanded in 1989. Approximately 120 transects occur within the NP&PR in Canada and 48 in the U.S. Transects vary in length, and are broken into 30-km segments, with the 48 U.S. transects totaling approximately 10,400 km. Since 2000, five species of grebes have also been monitored on the ground verification segments (air-ground surveys) in Prairie Canada. Other than American Coot, waterbirds are not the primary target of these surveys and the accuracy of current methodology for surveying waterbirds has not been tested. Information on wetland number, type, and habitat condition also is recorded on these surveys.

The U.S. Fish and Wildlife Service conducts surveys to estimate population size and level of harvest for management of certain waterbirds harvested in the United States and Canada. The nesting range of the mid-continent population of Sandhill Cranes includes the northern limits of the NP&PR, but the majority of the population migrates and stages throughout the Region excluding Minnesota and Iowa. Spring surveys of staging cranes in the central Platte Valley of Nebraska have been conducted annually since 1982. However, data on Common Moorhen, Sora, and Virginia Rail population sizes, distribution, and trends are lacking. Annual harvest information for American Coot, Purple Gallinule, Common Moorhen, rails, and Sandhill Crane are provided in the United States through the Migratory Bird Harvest Information Program (HIP) conducted by USFWS Division of Migratory Bird Management. Similar information is collected in Canada by the Canadian Wildlife Service through the National Harvest Survey of migratory bird hunters who purchase the Canadian Migratory Bird Hunting Permit. In Canada, American Coots are harvested annually across the NP&PR and Sandhill Cranes are harvested in Saskatchewan and Manitoba. Hunting of rails, which formerly occurred in all three prairie provinces, is no longer permitted.

In Prairie Canada many colonial waterbird species were surveyed in the 1960s and reported on in a number of articles by K. Vermeer of the Canadian Wildlife Service. Comprehensive surveys of American White Pelican, Double-Crested Cormorant, gulls, terns, and Great Blue Heron were conducted in 1998 in south and central Alberta. In Saskatchewan, all known American White Pelican and some Double-crested Cormorant colonies were surveyed in 1991. In 1999, a survey of Saskatchewan provincial wildlife field staff was used to define the status of a number of Great Blue Heron colonies. The most recent survey of colonial birds in Manitoba was conducted in 1999 on Lake Winnipegosis. Incidental data exist for most other waterbird species in the NP&PR as identified in several general or specific surveys.

The Whooping Crane is federally listed as an endangered species in both countries and the Least Tern is federally listed as an endangered species in the United States. The Whooping Crane is

considered a migrant in the NP&PR and is monitored irregularly during migration with primary monitoring efforts occurring on the breeding and wintering areas. The Least Tern is regularly surveyed in those states that have breeding populations. Least Bittern and Yellow Rail are federally listed as Threatened or Species of Special Concern, respectively, in Canada, but they are not monitored with any regularity at this time. A number of species are listed as threatened or endangered or as species of special concern at state or provincial levels (Appendix C); many of these jurisdictions have developed monitoring or survey strategies suited to specific information needs in the conservation of these species. For example, the Yellow Rail, listed nationally, and Virginia Rail were the focus of an Alberta province-wide survey of all known and potential sites in 2000 to provide information on current status and distribution of these species.

Waterbirds have generally received little research effort relative to waterfowl due to the minor economic impact of waterbirds and associated funding relative to waterfowl. Comprehensive research studies on waterfowl and wetlands in the NP&PR have been undertaken by the USFWS, CWS, USGS Northern Prairie Wildlife Research Center, the Delta Waterfowl Research Station, Ducks Unlimited, and the Institute for Wetland and Waterfowl Research, to name a few. Many of the techniques and underlying ecological relationships from waterfowl research can serve as a foundation to better understand waterbirds with similar habitat needs and will be useful in planning future waterbird research. Research on waterbirds is occasionally conducted by faculty and graduate students at universities from within and without the region. Most research is conducted in cooperation with state, provincial, and federal resource management agencies. In the United States, the Webless Migratory Gamebird Research Program is available to support research of webless migratory gamebirds, including waterbirds. Between 1995 and 2000 this program provided $1,141,468 to support 33 projects with a total cost exceeding $4,000,000 nationally.

1.4.iii Conservation Initiatives

As with monitoring, existing waterbird conservation efforts are uncoordinated and opportunistic. The information included in this section is not inclusive and does not identify all existing conservation initiatives.

In the United States and Canada, conservation of waterbirds has received little attention, although regional or continental plans have been developed for threatened and endangered species, as well as some other high priority species (Table 2). A continental plan has been developed for colonial waterbird species, as well as management guidelines for harvested species (Table 2). Local plans vary with jurisdiction; specific status or rankings by federal and provincial or state governments are outlined in Appendix C.

Table 2. Regional and continental conservation plans, management plans, and assessments developed for waterbirds in North America. Full citations are provided in Section 7 of this document.

Species	Plan/Title
Least Tern	Recovery Plan for the Interior Population of the Least Tern
Whooping Crane	1996-1997 Contingency Plan: Federal-state Cooperative Protection of Whooping Cranes (U.S.); National Recovery Plan for the Whooping Crane (Canada); Whooping Crane Recovery Plan (U.S)
Sandhill Crane	Management Guidelines for Mid-continent Sandhill Cranes
Black Tern	Status Assessment and Conservation Plan for the Black Tern in North America
Caspian Tern	Status Assessment and Conservation Recommendations for the Caspian Tern in North America
Double-crested Cormorant	Final Environmental Impact Statement: Double-crested Cormorant Management in the United States
Colonial waterbirds	Waterbird Conservation for the Americas
Harvested species	Migratory Shore and Upland Game Bird Management in North America

Waterfowl conservation actions, particularly wetland conservation, have resulted in considerable benefits for many species of waterbirds in the region. The North American Waterfowl Management Plan (NAWMP) was established as a joint effort by Canada, the United States, and Mexico to enhance continental waterfowl populations. The U.S. government provided incentives for migratory bird conservation through passage of the North American Wetlands Conservation Act (NAWCA; northamerican.fws.gov/NAWCA/act.htm) in 1989. NAWCA supports NAWMP objectives by encouraging public-private partnerships to conserve North American wetland ecosystems for waterfowl, other migratory birds, fish, and wildlife. From 1986-2002, NAWMP partners channeled $2.3 billion (U.S.) to protect and enhance 9.8 million acres of waterfowl habitat continent-wide, which also benefits many non-waterfowl species. In the NP&PR, partners channeled more than $500 million through the Prairie Pothole and Prairie Habitat joint ventures to protect and enhance 3.9 million acres of waterfowl habitat. NAWMP was updated in 1998, specifically directing benefits for other species in addition to waterfowl. The second objective of the PPJV implementation plan is to "Stabilize or increase populations of declining wetland/grassland-associated wildlife species in the PPR, with special emphasis on non-waterfowl migratory birds." Program delivery by the PPJV increasingly reflects this broadened mandate. Similarly, the PHJV's Strategic Framework for 1999-2004 states that the PHJV will work together with other bird initiatives, through the North American Bird Conservation Initiative, to facilitate a coordinated approach to bird and habitat conservation.

Ramsar Wetlands of International Importance, as designated under the Ramsar Convention of 1971, often are important staging and breeding areas for colonial waterbirds. Designated Ramsar sites in the NP&PR include Beaverhill Lake, Alberta; Last Mountain and Quill Lakes, Saskatchewan; Oak-Hammock and Delta Marshes in Manitoba; and Sand Lake National Wildlife

Refuge, South Dakota. The Western Hemisphere Shorebird Reserve Network (WHSRN) program, although directed at shorebirds, highlights important wetlands that also are beneficial to other water-dependent species. Although designation as a Ramsar wetland or WHSRN site does not confer any direct protection, the designation does provide international recognition of a site's natural values.

The Important Bird Areas (IBA) program of BirdLife International has four site categories and in the NP&PR recognizes sites of importance to congregatory species. Sites can be designated as IBAs of global, continental, or national significance according to their use by birds in numbers that meet specific thresholds. However, IBA designation does not confer direct protection. The IBA program in Canada, cooperatively delivered by Bird Studies Canada and the Canadian Nature Federation, has identified and designated a number of sites in the NP&PR. The majority of these sites are associated with lakes or large wetland complexes, and several meet IBA thresholds for significant use by various waterbird species (Table 3). At select sites, management plans are being developed by the local committees or groups that nominated these sites. Site plans can include strategies for ongoing surveys and monitoring of birds using the site. The American Bird Conservancy is identifying globally important IBA sites in the U.S., whereas the Audubon Society is identifying IBAs of state significance. The IBA process in the U.S. portion of the NP&PR is primarily in a planning phase; the Audubon Society will be assembling a technical team to work on IBA development in the region.

Table 3. Distribution and status of Important Bird Areas in the Canadian Prairie portion of the Northern Prairie & Parkland Waterbird Conservation Region.

	Alberta	Saskatchewan	Manitoba
Total number of IBAs in the NP&PR (BCR11)	30	44	10
Total lake- or wetland-associated IBAs	29	36	9
Total IBAs meeting threshold for use by waterbirds (various species)	9	18	8

In the United States, the U.S. Fish and Wildlife Service has extensive programs, funded largely through sale of federal Duck Stamps, to protect wetland and grassland habitat for waterfowl through fee title purchase and conservation easements. As of 2002, the sale of federal Duck Stamps has generated more than $600 million. This money has been used to conserve over 5 million acres of waterfowl habitat in the United States, which has been incorporated into the U.S. Fish and Wildlife Service's National Wildlife Refuge System (Table 4). Historically, many lands were protected through fee title purchase, but presently the primary tool for protecting wetlands and surrounding uplands is purchase of conservation easements. Ducks Unlimited is a major funding partner in easement acquisition in portions of the NP&PR. The Wetland Reserve Program (WRP) is an important U.S. Department of Agriculture program that protects and enhances wetlands and surrounding uplands. However, availability of money for WRP varies among states, and in some areas, demand for WRP leases exceeds available funding. In Canada, protection is provided to wetlands and uplands located within the Migratory Bird Sanctuaries and National Wildlife Areas administered by the Canadian Wildlife Service. Additional habitat is protected through the National Parks network and by state and provincial agencies and non-governmental organizations.

Table 4. State totals for lands protected under U.S. Fish and Wildlife Service fee title and permanent easement conservation programs. Numbers are approximate.

	North Dakota	South Dakota	Montana	Minnesota	Iowa
Refuges (number)	62	7	22	12	6
Refuges (acres)	296,000	52,000	1,149,000	214,000	86,000
Waterfowl Protection Areas (acres)	254,000	155,000	107,000	177,000	18,000
Wetland easements (acres)	820,000	472,000	25,000	91,000	3,000*
Grassland easements (acres)	136,000	429,000	34,000	814	< 1,000*

*Iowa presently has 103,000 acres enrolled in various forms of the Wetland Reserve Program; wetlands are the primary focus of this program, but many acres of grassland also are protected, reducing inputs of fertilizer, pesticides, and silt.

The U.S. Fish and Wildlife Service also administers the Partners for Fish and Wildlife program that assists private landowners with habitat restoration, development, and management on their property. In addition to providing technical and financial assistance, the program protects thousands of acres of wetlands and grasslands under term leases in the U.S. portion of the NP&PR. Since 1987, the Partners for Wildlife Program and cooperators have helped 2,500 landowners enhance wildlife habitat on 162,000 acres in North Dakota alone. More than 25,000 landowners nationwide have participated in this voluntary program. A variety of additional conservation programs are available through the U.S. Department of Agriculture, including the Wildlife Habitat Incentive Program, the Environmental Quality Incentive Program, and the Conservation Reserve Enhancement Program.

1.4.iv Role of the Northern Prairie & Parkland Region in North American Waterbird Conservation

The millions of wetlands in the NP&PR are the foundation of the famed "duck factory" of North America, and the PPJV and PHJV of the NAWMP were set up to guide waterfowl management in the region. Within these joint ventures, high priority landscapes have been targeted for wetland and upland conservation efforts over the last 15 years. Although efforts have been specifically directed at waterfowl, benefits to other water-dependent species likely are considerable as the wetlands that benefit waterfowl can also benefit waterbirds with similar habitat needs. Given the long history of wetland and upland conservation in the NP&PR and resultant development of management expertise, integration of conservation efforts may especially benefit waterbirds.

The NP&PR harbors a large proportion of the total population and breeding range for many North American waterbird species. Information on waterbird populations is notoriously poor, but it is estimated that the proportion of the continental breeding population found in the NP&PR is > 60% for Franklin's Gull; > 50% for Pied-billed Grebe, American Bittern, Sora, American Coot, and Black Tern; and approximately 30% for American White Pelican and California Gull. High numbers of waterbird species and individuals in the NP&PR indicate that the area is

critically important to continental waterbird conservation. However, waterbirds breeding in the NP&PR spend only a portion of their annual cycle there, and migration corridors, staging areas, and wintering grounds are also vital to waterbird conservation. Continental planning efforts must recognize and support conservation of linkages between different geographic regions, and regional plans should identify and address conservation issues within their respective boundaries.

2.0 WATERBIRDS IN THE NORTHERN PRAIRIE & PARKLAND REGION

2.1 Introduction

2.1.i Colonial vs. Non-Colonial Breeders

The majority of waterbird species (24, or 62%) that breed in the NP&PR are colonial nesters whereas the remainder (15 species, 38%) are generally solitary nesters (Table 1). The NP&PR has a relatively high proportion of non-colonial nesters, as only 20% of waterbird species across the continent are non-colonial nesters. Some species, particularly herons and egrets, nest in mixed-species colonies. A few colonial species occasionally nest singly, and a few solitary species occasionally nest in small groups or loose colonies. The former situation may be the result of low population levels or lack of sufficient food supplies; the latter may result from a superabundance of food resulting in a close nesting association that may be described as semi-colonial behavior.

2.1.ii Staging and Migrant Waterbirds

Waterbirds often stage, or congregate, prior to and during migration. During this time the birds forage and rest, taking advantage of secure roost sites and high-energy food resources to gain fat prior to continued migration and the breeding season. A well-known staging area outside the NP&PR is the annual congregation of 500,000 Sandhill Cranes in the Platte River Valley, but staging areas, and their importance to a species' conservation, are not limited to Sandhill Cranes during spring. Many species of waterbirds stage in late summer, fall, winter, and spring at lesser-known but equally important locations to replenish and build energy reserves, rest, molt, or initiate pre-breeding courtship behavior. For example, Eared Grebes move to saline staging/molting lakes in the Great Basin of the United States prior to fall migration, although some adults will molt closer to breeding areas. During migration, Franklin's Gulls congregate in large (formerly up to 2.5 million birds) flocks. Common Loons, which are highly territorial during the breeding season, also stage on large lakes where food is abundant.

Staging areas are extremely important energetically. For example, Sandhill Cranes may increase their body mass up to 20% at staging areas. Efficient foraging is probably even more important when species undergo molt, which is energetically demanding. Unfortunately, human disturbance to staging birds can have significant energetic consequences, and human presence at staging areas should be minimized. Because of their importance to waterbirds for feeding, molting, migration, energetics, and social interactions, protecting staging areas may be as important as protecting breeding and wintering habitat.

2.2 Breeding Waterbirds: Biology, Distribution, and Status

2.2.i Distribution and Habitat Needs of Nesting Species

Distribution of the 39 species breeding within the NP&PR can be clumped into three general categories: widespread, peripheral, and local (Table 1, Appendix D). Twenty-five species that breed in the NP&PR do so over > 10% of the NP&PR and are considered "widespread" breeders. Five species that breed in few highly localized or confined sites across the region are considered "local" breeders. Nine species are considered peripheral breeders, with primary breeding ranges outside the NP&PR and occasional breeding occurrences at the fringes of the NP&PR. Many additional species are occasionally found in the NP&PR either as very rare breeders or vagrants during spring or fall migration; all waterbird species that have been observed in the NP&PR are listed in Appendix A.

Colonial waterbirds may be subdivided according to the substrate that they choose for nesting. In general, these species may nest on a floating platform, on an island, or in trees or tall shrubbery. With few exceptions most species fall neatly into one of these categories. Species using the same nesting substrate often are found nesting in association with other colonial waterbirds. Species nesting on platforms in marshes include the Eared, Western, and Clark's grebes, Black-crowned Night-Heron, White-faced Ibis, Franklin's Gull, and Forster's and Black terns. The solitary nesting American Coot may be found nesting with these species. Among the island-nesting species, American White Pelicans, Double-crested Cormorants, California, Herring and Ring-billed gulls, and Caspian and Common terns often are found nesting together. Tree-nesting species include most of the herons and Double-crested Cormorants in some areas. These colonies may be composed of single species or, especially in the southeastern portion of the NP&PR, many species. Non-colonial species may nest on a floating platform of vegetation, in emergent vegetation over water, or on the ground in drier sites such as sedge meadows, or even in dry upland vegetation. Cranes build a mound of vegetation that may be constructed in shallow water on or near the edge of a wetland.

Waterbirds also can be categorized by their preference for a general type of wetland utilized for nesting during the breeding season in the NP&PR (Table 5); more detailed habitat requirements are recorded in the waterbird species accounts (Appendix D).

Table 5. General waterbird habitat preferences based on amount of emergent vegetation, open water, and preferred nesting habitat.

Group A Wetland with - substantial emergent vegetation - variable open water	**Group B** Wetland with - emergent vegetation - partial open water	**Group C** Wetland with - emergent vegetation - extensive open water	**Group D** Wetland with - emergent vegetation - open water - nesting trees	**Group E** Lake or River - open water - barren ground - islands
American Bittern	Sandhill Crane	Common Loon	Great Blue Heron	American White Pelican
Least Bittern	Franklin's Gull	Pied-billed Grebe	Great Egret	Double-crested Cormorant
Black-crowned Night-Heron	Bonaparte's Gull	Horned Grebe	Snowy Egret	Ring-billed Gull
Yellow Rail	Forster's Tern	Red-necked Grebe	Tricolored Heron	California Gull
Black Rail	Black Tern	Eared Grebe	Little Blue Heron	Herring Gull
King Rail		Western Grebe	Cattle Egret	Caspian Tern
Virginia Rail		Clark's Grebe	Green Heron	Common Tern
Sora		White-faced Ibis	Yellow-crowned Night Heron	Least Tern
		American Coot		
		Common Moorhen		

Wetlands in Group A generally have extensive stands of emergent vegetation. These sites range from flooded sedge meadows to cattail or bulrush stands in deep water marshes and may be seasonal to permanent wetlands. The second group of wetlands (B) includes mostly larger, permanent freshwater marshes with patches of emergent vegetation interspersed with open water. Wetlands in the third group (C) have emergent vegetation (sedges, rushes, *Phragmites*) with extensive areas of open water. Some shallow-water marshes are included in this set but the majority are deep-water marshes or lakes. The fourth group (D) of wetlands is typified by the presence of wooded areas that serve as nesting sites on islands, flooded stands of trees, or uplands near the wetland; some waterbirds using this group also will nest on barren sites. The final group (E) includes wetlands or waterways with an island (vegetated or barren), sandbar, or exposed shoreline. Although these species are separated into general categories, habitat preferences will overlap across the region. Many wetlands have multiple vegetation zones that reflect basin substrate and water depth; distribution and structure of vegetation in a basin may change depending on variation in water levels. Maintaining appropriate interspersion of vegetation and wetland complexes is important because waterbirds may use multiple zones throughout the year or in different years.

2.2.ii Population Estimates & Trends of Breeding Waterbirds

Population estimates and trends are reliable for only a few of the species covered by this plan. Numbers of strongly colonial species that are historically of management interest, such as American White Pelican, are relatively well known for local populations, as are regional population estimates for Sandhill Crane and American Coot, which are popular game birds. For these species, specific inventories and surveys have been conducted and can be used to estimate population size and trends.

For many of the remaining species only the BBS contains useful data, despite weaknesses of this survey for detecting some waterbird species. Nonetheless, the BBS does provide some indication of which species are increasing or decreasing, and serves to further highlight those species most in need of additional monitoring. For example, some waterbird species such as Whooping Crane only breed in areas lacking BBS coverage. Other species such as Yellow Rail are present in areas with BBS coverage, but detection is so low as to preclude analysis. Population trends can be estimated from the BBS at continental, regional, BCR, and state/province scales. Knowledge of trends across North America is generally better than at finer scales due to a greater number of survey routes at the continental scale. Correspondingly, continental population trends are more likely to show statistical significance because of larger sample sizes than at the BCR scale.

We reviewed trend analysis of data for 36 species regularly found on BBS routes (excluding Yellow Rail, Black Rail, Whooping Crane, and Bonaparte's Gull) from 1966-2000. Across North America, these data indicate that 12 of the 36 species showed statistically significant ($P < 0.05$) increases, and 5 showed statistically significant decreases (see Species Accounts, Appendix D, for details). However, reliability of trend estimates is low for many species even at this broadest scale because of small sample sizes and high variation. Within the NP&PR, four species showed statistically significant increases, and two showed statistically significant decreases. Reliability of trend estimates is even lower within the BCR because of reduced sample sizes relative to continental estimates.

Virtually no information exists on total population size in either North America or the NP&PR for marshbirds and some colonial species. Of those species for which a NP&PR population estimate is available, Eared Grebe and American Coot are considered the most abundant, with breeding populations likely exceeding 800,000 individuals. California Gull, Franklin's Gull, Double-crested Cormorant, and perhaps Ring-billed Gull probably number in the 100,000s. Several species have large continental breeding populations but are only peripheral breeders in the NP&PR including Cattle, Great, and Snowy egrets, and Tricolored Heron, among others. Other species such as Yellow Rail and King Rail are widespread in the NP&PR, but with low abundance. For most species, information is insufficient to set population targets.

2.2.iii Key Sites Used by Breeding Waterbirds

A majority of the colonial waterbirds breed in fairly large concentrations and use specific lakes or sites on an annual or fairly regular basis. These sites may consist of islands or wooded patches typically used by herons and Double-crested Cormorant or emergent vegetation typically used by grebes, terns, and some gulls (Table 5). Many of these sites have been identified through systematic surveys and observations. Most non-colonial species nest in low densities, making it difficult to define key breeding areas. The ephemeral nature of prairie wetlands further complicates the process as many non-colonial and some colonial species (e.g., Franklin's Gull, Eared Grebe, Black Tern) shift nesting sites among years depending on availability of water and nesting habitat conditions. Wetland complexes of varying size and degree of permanency surrounded by upland habitat are likely the most appropriate targets as key areas for this suite of species.

Key sites in the NP&PR identified as critical to the conservation of populations of waterbirds will be recognized on several levels of importance as outlined by BirdLife International under the Important Bird Area (IBA) program (www.ibacanada.com and www.audubon.org/bird/iba). Global and continental IBAs are identified through application of quantitative criteria based on numbers of birds using the site as noted below:

- Globally Important Waterbird Area – The site is known to hold or thought to hold on a regular basis 1% or more of the global population or 20,000 or more waterbirds.

- Continentally Important Waterbird Area – The site is known to hold or thought to hold on a regular basis 1% or more of the continental population or 15,000 or more waterbirds.

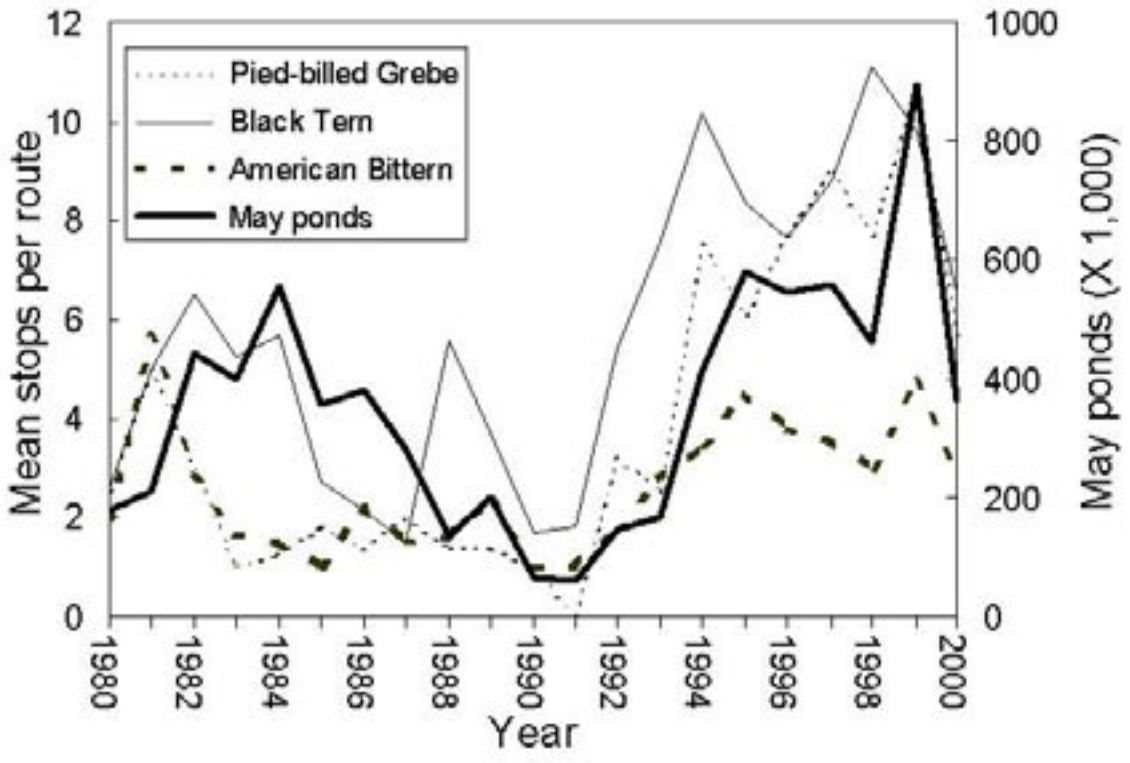
A regional site may not meet IBA criteria even though it is highly important to a species listed under a regional jurisdiction's endangered species act (e.g., Least Tern sites on the Missouri River) or a species' status assessment listing (e.g., Yellow Rail sites in Alberta). A list of these sites needs to be developed under the heading of "Regionally Important Waterbird Sites."

The BirdLife database will be used to maintain the inventory of Important Bird Areas for waterbirds in North America. Databases and inventory of Important Bird Areas at regional levels will be maintained by the National Audubon Society in the United States and by Bird Studies Canada and the Canadian Nature Federation in Canada. However, given the broad spatial distribution of wetland habitat in the NP&PR and dispersed breeding of many marshbirds, focusing attention only on IBAs or individual sites will result in a huge shortfall of conservation for most marshbirds. Therefore, entire landscapes will need to be identified and preserved, as well as specific locations identified under projects such as the IBA program.

2.2.iv Spatial and Temporal Variability in Breeding

The breeding distribution and density of many species of waterfowl in North America are influenced by the number and condition of wetlands. Understanding this relationship is critical to the monitoring and management of waterfowl populations in the NP&PR. Although the effect of wetland availability on breeding distribution and density of waterbirds is poorly known, limited information indicates that waterbirds are affected in a manner similar to waterfowl. Numbers of several waterbird species are positively correlated with number of May ponds (Figure 2), and changes in Black Tern populations in the prairie provinces of Canada are correlated with changes in Mallard populations, both of which change with availability of wetlands.

Figure 2. Relationship between mean number of BBS stops on which Pied-billed Grebe, Black Tern, and American Bittern were detected and estimated number of May ponds in north-central North Dakota, 1980-2000.



Fluctuations in waterbird numbers in response to wetland availability may be particularly important in the NP&PR, which is highly susceptible to drought and harbors a large proportion of the breeding populations for several species of waterbirds. Understanding the relationship between wetland numbers and waterbirds is likely as critical to the monitoring and management of waterbird populations in the NP&PR as it is for waterfowl. For example, if birds settle in different areas depending on water availability, apparent changes in local and regional populations may reflect wetland conditions instead of true population changes.

In addition to affecting regional numbers and distribution of waterbirds, changes in water availability can alter habitat and influence local distribution and behavior of waterbirds. Temporal variation in water levels creates the "reservoir effect," which influences productivity of wetlands and potentially their suitability for waterbirds. Changes in water levels also encourage horizontal zonation of emergent vegetation, which is important to many species of waterbirds. Population movements, foraging tactics, breeding seasonality, prey availability, susceptibility to predation, foraging sociality, competition, nest site selection, and nest site tenacity of waterbirds all can be influenced by water availability, although effect varies with species and location. Ultimately, altered behavior, prey availability, and susceptibility to predation can affect local reproductive success and population size. Effects of water availability on waterbirds also may be influenced by water availability in other regions, as well as other local conditions such as land use.

2.3 Staging and Migrant Waterbirds: Distribution, Habitat, and Status

2.3.i Habitat Needs of Staging and Migrant Waterbirds

Several species of waterbirds have breeding ranges that lie primarily north of the NP&PR. These species, including Sandhill Crane, Herring Gull, and Bonaparte's Gull, may rely on habitat within the NP&PR for migration staging or stopover. Several other species, such as Eared Grebe, American Coot, and American White Pelican, may stage in large numbers on lakes other than their breeding lakes in preparation for southward migration in fall. Food resources may be inadequate or simply not available on breeding lakes to build the energy reserves required to successfully complete migration.

In particular, young birds may stage for a period of time after fledging to acquire energy reserves necessary for their first migration. Black Terns leave nest marshes and gather in flocks at preferred feeding sites for several weeks before migrating south. Soras and Virginia Rails congregate in larger wetlands with abundant food prior to migration. Before migrating to wintering areas, Red-necked Grebes move to molting sites, typically large lakes. Red-necked Grebes also congregate in spring on larger lakes, where calling and courtship behavior are common.

General habitat requirements of staging waterbirds therefore must include access to abundant food resources (e.g., aquatic or terrestrial sources) and areas that provide seclusion and/or security against disturbance and predation while molting, feeding, resting, or courting (e.g., emergent vegetation, upland cover or bare shorelines). Topographical variation and climate fluctuation create a diversity of wetland depths, permanency, and successional stages across the prairie pothole landscape, virtually assuring that wetlands in some portion of the NP&PR will meet the requirements of staging and migrant waterbirds in any one season. Larger lakes, marshes, and reservoirs tend to be more heavily used by staging birds due to abundance of food and lower likelihood of disturbance. Islands can be particularly valuable in providing secure roosting areas. Sandhill Cranes make frequent and heavy use of sandbars in major rivers. The South Saskatchewan River near Outlook and Eston in southwestern Saskatchewan provides excellent resting sites with access to rich food sources (e.g., extensive grain fields) during fall migration. However, changes in water levels of lakes, reservoirs, and rivers can have a major impact on the suitability of islands and sandbars by affecting the number and distribution of sites and the presence of connections to mainland.

2.3.ii Whooping Crane: The Northern Prairie & Parkland Region's Migrant

The Whooping Crane is the only non-breeding species included in this plan, and its population hit a low point in 1941 with only 15 individuals in a migratory flock and six in a non-migratory flock. As of 2003, there were 300 Whooping Cranes in the wild. Of these, 194 belonged to the Wood Buffalo-Aransas flock, which migrates through the NP&PR each spring and fall. It is predicted that the Whooping Crane population in North America will reach 500 birds in approximately 27 years. Although the species clearly remains in an extremely vulnerable situation, it is expected to continue a slow recovery.

The Whooping Crane migrates through the NP&PR each spring and fall, stopping to rest and feed. Roosting or migration stopover sites for Whooping Cranes are typically freshwater, shallow wetlands, usually less than four hectares in size and less than one kilometer from foraging sites. In spring, temporary and seasonal wetlands are used most frequently for roosting, whereas semi-permanent and permanent wetlands are used during fall. For feeding, birds utilize croplands at upland sites, generally close to roost sites. Sites that are further from potential disturbance (e.g., buildings) or threats (e.g., powerlines) are preferred.

Migration of the Whooping Crane is well monitored in the NP&PR, and several sites throughout the NP&PR are used by migrating birds on a regular basis (Appendix E), although only a few birds may use each site in any given year. For a comprehensive overview of Whooping Crane sightings on migration in the U.S., visit www.npwrc.usgs.gov/resource/2003/wcdata/wcdata.htm. Canada's Whooping Crane Recovery Plan (1994) identifies a need to protect habitat at these areas, which may be possible for some wetlands, but migrant Whooping Cranes also forage in fields and other uplands, which are frequently privately owned and less easily protected.

2.3.iii Key Sites Used by Staging Waterbirds

Generally speaking, knowledge of key sites for staging waterbirds is weaker than for breeding birds; however some of the higher profile sites in Canada are identified in Appendix F. Sandhill Cranes, which are hunted in some areas, are surveyed regularly and major staging areas are well documented across the region. American Coots and grebes are often found in close association with large concentrations of waterfowl during spring and fall migration. Sites important to staging waterfowl also may be of importance for these species, but this must be verified. For most species, sites used during migration and staging are poorly documented, and the importance of the NP&PR to staging birds is not known. However, conservation of wetland complexes and associated uplands within the region will help ensure that necessary habitats are available for migrant and staging waterbirds, even if knowledge of specific sites and requirements is limited.

2.4 Conservation Issues and Threats to Waterbirds

Following the arrival of Europeans on the prairie landscape, waterbirds have been subjected to a broad range of pressures including habitat loss, habitat degradation, hunting, and harassment because of perceived competition for fish. Enactment of the *Migratory Bird Convention (Treaty) Act* and subsequent regional wildlife acts have provided some protection. However, habitat in the NP&PR continues to be lost and degraded as a result of human activities including agriculture, oil and gas exploration and development, urban and recreational development, fisheries, forestry, and hydroelectric development. A prioritized list of conservation issues in the NP&PR was developed through a series of discussions and meetings among conservation partners and is provided in Table 6; a detailed list of conservation issues and threats is provided in Appendix G.

Table 6. Prioritized conservation issues and threats to waterbirds in the Northern Prairie and Parkland Region.

Issue	Priority	Geographic Scale (Broad: 1 - Local: 5)	Uncertainty Level (Low: 1 - High 5)	Number of species
Wetland Loss/Deterioration	High	1	1	All
Upland Habitat Loss/Deterioration	High	1	2-3	Most
Climate Change	Medium	1	5	All
Contaminants	Medium	2	5	Most
Disturbance / Recreation	Medium	3	3	Few
Water Management	Medium	3	3	Most
Over-abundant Species	Medium	4-5	1	Few
Disease / Toxicity / Parasites	Medium	4-5	3-4	Most
Fisheries / Aquaculture	Medium	4-5	4-5	Few
Exotics / Invasives	Medium	4-5	4-5	Unknown
Collisions	Low	4	5	Most
Depredation	Low	5	1	Few
Predators	Low	5	1	Few
Artificial Islands	Low	5	1	Few
Fire	Low	5	1	Unknown
Ingestion / Garbage	Low	5	3	Unknown
Harvest	Low	5	3-4	Limited

2.5 Conservation Priority of Waterbirds in the Northern Prairie & Parkland Region

2.5.i Conservation Status Assessment Process

The conservation status of each of the 40 species covered by this plan was evaluated based on available—though often limited—information. Primary sources included BBS data from BCR 11 over the period 1966-2000 and the Partners In Flight species assessment database, which were supplemented with information from Manomet Science Center. Species were classified into one of four categories according to the conservation threats they face. Prioritization labels below are modified somewhat from the continental plan that identifies five categories; labels from the continental plan are listed in parentheses:

Listed (***Highly Imperiled***): Federally listed (Canadian or U.S.) endangered or threatened species.
High Concern: Populations known or thought to be declining; other known or potential threats exist.
Moderate Concern: Populations are either a) declining with moderate threats or distributions; b) stable with known or potential threats and moderate to restricted distributions; c)

relatively small; d) relatively restricted; and e) declining but with no other known threats. Low Risk (Combined ***Low*** and ***Not Currently at Risk***): Populations are either a) stable with moderate threats and distributions; b) increasing but with known or potential threats and moderate to restricted distributions; or c) of moderate size.

Species were prioritized by evaluating six factors that influence the level of threat faced by each species. These factors were evaluated using survey data, information from the ornithological literature, and by species experts. Scores for each factor ranged from 1 (most secure) to 5 (most vulnerable) and are listed in the species accounts (Appendix D). Thresholds for scoring of each factor differed for colonial and non-colonial species in recognition of different threats conferred by the biology of the two groups. The factors evaluated were:

- population trend and population trend uncertainty during the period 1966-2000
- relative abundance
- threats faced during the breeding season
- threats faced during the non-breeding season
- breeding distribution
- non-breeding distribution

Species were initially evaluated for all of North America by a committee appointed by the North American Waterbird Conservation Plan. The proportion of the continental breeding population found within the NP&PR was included as a seventh factor to assess the importance of the NP&PR to each species. These proportions then were converted to an Area Importance Score of 1 - 5 according to the following:

Proportion of North American population breeding in BCR11	Area Importance Score
> 50 %	5
25 - 49 %	4
10 - 24 %	3
1 - 9 %	2
< 1 %	1

Species receiving an Area Importance Score of 5 were raised by one concern category (e.g., from moderate to high concern) because of the extreme importance of the NP&PR to continental conservation of that species. For some species, the continental population also represented the global population, thereby increasing the importance of regional conservation efforts. Species receiving an Area Importance Score of 1 may have been lowered by one or more concern categories following review by regional experts to reflect the minimal effect that conservation activities within the NP&PR would have on them.

2.5.ii Conservation Status Rankings

Preliminary scores (Table 7) have been reviewed and occasionally adjusted according to input from species experts and updated information. We differentiated between prioritization based solely on conservation vulnerability and prioritization based on management interest because of a species' harvest status or nuisance or over-abundance potential. For example, Sandhill Crane and Sora are relatively abundant and increasing in the NP&PR and are therefore considered to have low conservation vulnerability; however, they are of high management interest because they are harvested in some areas. Similarly, Double-crested Cormorant, California Gull, and Ring-billed Gull are considered of low conservation vulnerability because they also are abundant and appear to be increasing in some areas, but are of higher management concern because of the potential impact of Double-crested Cormorant on fisheries and concern about gull depredation of bird nests and fledglings, including those of the threatened and endangered Piping Plover.

Table 7. Conservation vulnerability rankings for waterbirds in the Northern Prairie & Parkland Region. Factor scores and further information on rankings are included in species accounts (Appendix D).

Vulnerability	Colonial Species	Non-colonial Species
Listed ‡	Least Tern	Whooping Crane, Least Bittern
High Concern	Western Grebe Franklin's Gull Black Tern	Horned Grebe American Bittern Yellow Rail King Rail
Moderate Concern	Eared Grebe American White Pelican Black-crowned Night-heron Great Blue Heron Caspian Tern Common Tern	Virginia Rail Black Rail
Low Risk	Clark's Grebe Double-crested Cormorant* White-faced Ibis Little Blue Heron Snowy Egret Tricolored Heron Yellow-crowned Night-heron Cattle Egret Great Egret Green Heron Ring-billed Gull* California Gull* Herring Gull Bonaparte's Gull Forster's Tern	Common Loon Pied-billed Grebe Red-necked Grebe Sandhill Crane** Sora** Common Moorhen** American Coot**

‡ Species are federally listed as endangered or threatened in Canada and/or the U.S. and already have or will have conservation plans in place.
* may be of higher management concern due to issues associated with increasing populations.
** may be of higher management concern because of harvest in some locations.

Most of the species of high conservation concern have experienced sharp population declines or have a large proportion of their population in the NP&PR. For example, >66% of Franklin's Gulls in North American breed within the NP&PR, and conservation activities in the NP&PR should provide significant benefits for species such as these. Many species of moderate concern are declining, are likely to decline given known threats, or would be highly susceptible to potential threats not yet occurring. These frequently are species for which additional information is required, and that should be monitored closely. However, it is important to note that regional population trends can be highly variable for some waterbird species, depending on water conditions. Included in the low risk group are some species of high concern range-wide but that breed at the margins of the NP&PR.

3.0 WATERBIRD INFORMATION NEEDS AND CONSERVATION STRATEGIES

3.1 Introduction

A recurring difficulty throughout the development of this plan has been the general paucity of information about waterbirds in the NP&PR. High-profile species such as Whooping Crane or Least Tern are relatively well understood, as are some harvested species such as Sandhill Crane and American Coot. However, so little is known about some marshbird species in the NP&PR that we are presently unable to accurately define their range, distribution within their range, population size, or breeding status. Obviously, lack of information complicates and impairs conservation planning. We have identified general information needs that are required for effective conservation, as well as more specific research questions that address the general information needs. A detailed—but not comprehensive—list of sampling issues, information needs, plan assumptions, and research questions is found in Appendix H.

A primary emphasis of all-bird conservation in North America is a landscape-level approach to decision-making and habitat management. This approach, if it is to be implemented, requires that habitat selection and population processes be understood at a landscape level, which requires a commitment for (1) better information on regional waterbird distribution, density, and demographics; and (2) accurate and current spatial data including landcover, wetlands delineation, and cultural/political features.

Knowing landscape-level relationships is not sufficient to ensure useful conservation guidance. Management treatments need to be identified and made available to managers to enhance habitat and populations where needed. This process could be similar to the Multi-Agency Approach to Planning and Evaluation (MAAPE) process that guides implementation of the North American Waterfowl Management Plan in the United States portion of the NP&PR. MAAPE identified specific local objectives and a comprehensive list of habitat-based strategies for meeting the objectives. However, information used to develop the process is based on decades of monitoring and scientific research and is focused on one species, the Mallard. Developing a similar process for waterbirds will require a significant commitment to understanding the response of waterbirds to local factors such as predation, vegetation characteristics, land use and management, and wetland restoration and management, all under a variety of conditions over broad geographic areas. In all cases, we need concrete products that managers can use as tools in protection and

management of waterbird habitat and populations (Appendix I). Because waterfowl are associated with higher levels of financial support and greater public awareness and support for related wetland preservation and management, areas of overlap with waterfowl management should be identified to maximize conservation benefits for other wetland-dependent birds. It also must be recognized that any management or conservation treatment will not benefit all species and that actions that change habitat characteristics may benefit some species and negatively impact others. These considerations are further complicated by the dynamic nature of vegetation and water levels in prairie wetlands.

Finally, accuracy, standards, and characteristics of population and habitat data should be evaluated and documented. Metadata descriptions should be applied to spatial data following content standards put forth by the U.S. Federal Geospatial Data Committee; sampling protocol and other pertinent information should be recorded for population data. When possible, data should be collected and archived at a single location that can be easily accessed by all cooperators.

3.2 Populations

3.2.i Population Inventory and Monitoring

The foremost information need for waterbird conservation in the NP&PR is the development and implementation of a regional/continental waterbird monitoring program. This survey should be designed to provide information on regional population change and focus on habitat associations rather than be an opportunistic aggregation of existing efforts. Survey issues are developed at length in Appendix H, but in general the survey(s) should:

(1) be stratified to sample the numerous wetlands of all sizes and types found in the NP&PR;
(2) be geographically extensive to capture regional changes in waterbird distribution;
(3) be geo-referenced to facilitate development of spatially explicit habitat models;
(4) consider colonial and non-colonial species;
(5) evaluate water conditions or be linked to indices of local or regional water conditions;
(6) provide linkage with national and international monitoring schemes to evaluate continental trends and distribution;
(7) be designed to provide information useful for conservation and not just monitor for the sake of monitoring; and
(8) build on existing resources when appropriate.

Population survey data will provide a better understanding of the distribution and density of waterbird species, particularly those that are rare or poorly sampled by other surveys. The data will help us understand regional population dynamics in relation to habitat (upland, water, wetland) availability locally and elsewhere within the species' range, as well as understand population trajectories at continental, regional, and local scales. Used in conjunction with landcover information, survey data will enable development of spatially explicit maps for use in conservation planning such as identification of high priority areas, identification of high risk areas, and simulation of the impact of disturbance.

3.2.i.a Breeding Waterbirds

Of central importance is the need to assess temporal and spatial variability of breeding birds, as this will dictate the type and frequency of surveys necessary to provide the statistical power to detect population trends. The magnitude of the trend required to be measured needs to be determined at the outset. At a continental scale, the North American Waterbird Conservation Plan sets as a target the ability to detect a 50% change in population over 10 years or three generations.

Survey and monitoring strategies and techniques will differ somewhat for colonial and non-colonial breeders. However, programs directed at these groups should be integrated to the fullest extent possible, either with each other or with other bird groups. Existing monitoring programs should be assessed as to their ability to address waterbird species. Most significantly, the BBS has about 35 years of standardized data on birds across the United States and southern Canada (see also Section 1.4.ii). Although designed primarily for landbirds, the BBS records data on all bird species. Because wetlands and colony locations are highly localized, wetland-associated birds and colonial nesting species may or may not be adequately sampled by the BBS. Quantitative assessment is required to assess the potential uses and limitations of the BBS for monitoring waterbird numbers.

3.2.i.b Staging and Migrant Waterbirds

Initial efforts should update information on known and potential staging sites including:

- site information such as size, wetland type, and key habitat features (e.g., upland, islands, emergent and terrestrial vegetation, expanses of exposed shoreline);
- species and number of birds;
- timing and duration of use for migration, non-breeders, moult, post-fledging; and
- interaction of birds with adjacent areas.

Where monitoring of endangered species is being addressed by conservation plans or recovery teams, those species will not be targeted and will be recorded as incidental observations during monitoring efforts for priority species and waterbird sites under this plan. However, recovery plans should be reviewed to identify what other waterbird species may be targeted through planned monitoring activities.

3.2.ii Population Goals

As we presently have insufficient information on actual population estimates except for a few colonial species, it is impossible to set population goals. For colonial species where a fairly accurate population estimate exists within the NP&PR, a reasonable first step would be to refine that estimate and set a “no-net loss” of population size. For species identified as potentially over-abundant, management strategies should ensure these species are not detrimental to the environment or other bird species utilizing similar breeding habitats. The next step would require an accurate and range-wide survey of all existing and potential colonial breeding sites within the NP&PR to qualify or refine population estimates.

For species lacking concrete population estimates, the focus should be on determining population trends. This focus would cover most non-colonial species in the NP&PR. The baseline for all species should be "no net loss." For some species where levels are extremely low and the NP&PR has a high level of responsibility, goals should be to better estimate populations and work to increase population levels where appropriate.

3.2.iii Priority Population Monitoring Action Needs

The following steps will provide a sound foundation for waterbird monitoring in the NP&PR:

- Assess the utility of existing monitoring programs for their potential uses and limitations. This includes the BBS, bird checklist programs, and nest record databases. The May Waterfowl Breeding Ground Surveys currently monitor American Coot, and several grebe species also are monitored on the Canadian ground-survey component. In addition to providing annual wetland data, these surveys may provide a foundation for developing additional waterbird surveys.
- Focus on priority species where capacity is limited, but develop partnerships to conduct multi-species surveys.
- Cooperate with North American Waterbird Conservation Plan partners to develop standardized, continental survey protocol for colonial and non-colonial species and to ensure that proposed continental monitoring programs meet the needs of the NP&PR.
- Encourage and support studies that contribute to the knowledge of waterbird population estimation in the NP&PR.

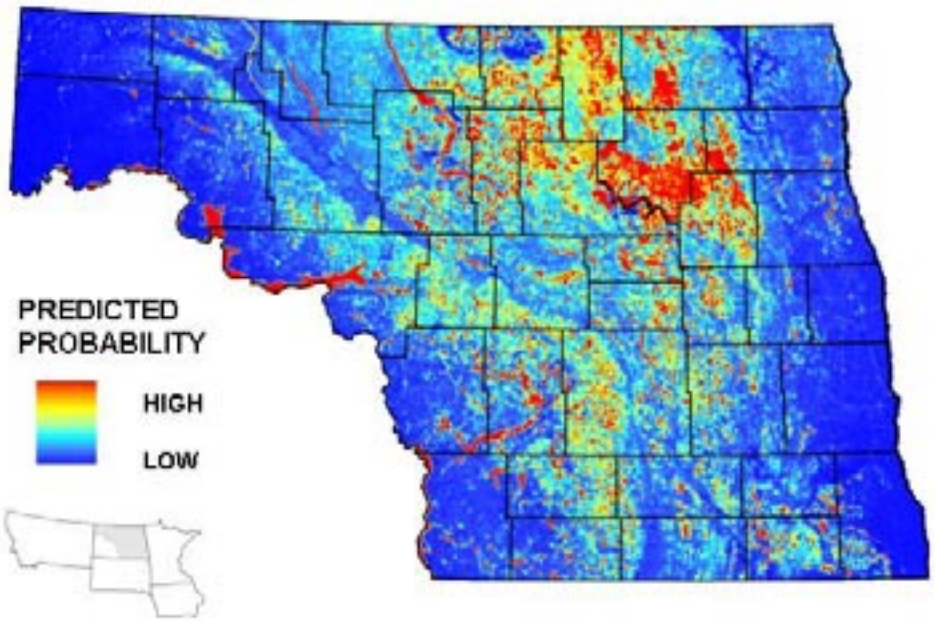
3.3 Habitat

3.3.i Habitat Conservation and Management Prioritization

Waterbird conservation is directly influenced by habitat quantity and quality. Prioritized waterbird conservation issues for the NP&PR (Table 6) identified loss and deterioration of wetland habitat as the highest priority issue in the NP&PR, followed by loss and deterioration of upland habitat. Consequently, identifying and preserving areas of high quality habitat are crucial for effective waterbird conservation. Habitat conservation and management strategies that influence broad landscapes will benefit the greatest number of water-dependent species and should be the major focus of habitat-related efforts, with primary emphasis on high priority species.

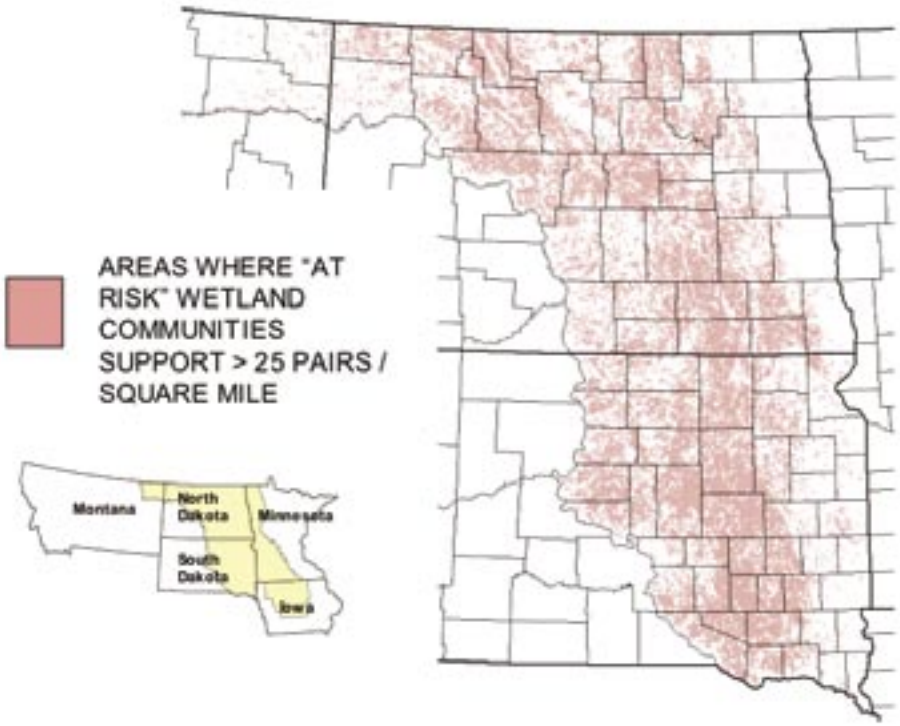
One way of identifying and prioritizing waterbird habitat is through spatially explicit models, which can be used to create maps showing potential habitat suitability at a landscape scale (e.g., Figure 3). Suitability may vary among years depending on water availability, and also will be influenced by local conditions such as vegetation composition and structure. Spatially explicit maps of this nature are another tool that can be used to identify key areas, as they can be overlaid to identify areas of value to multiple species. Implementing bodies of the PPJV and PHJV then can work to integrate management of waterbirds and other bird groups across political and geographic jurisdictions.

Figure 3. Predicted landscape suitability in east-river North Dakota for Black Tern in 1995. Model based on geo-referenced BBS data, NWI wetland information, and upland habitat data from classified LandSat imagery.



In addition to habitat suitability, prioritization of landscapes for waterbird conservation also should consider risk of habitat loss. For example, the U.S. Fish and Wildlife Service Habitat and Population Evaluation Team (HAPET) assessed risk of wetland conversion in the Prairie Pothole Region of North Dakota and South Dakota as it related to waterfowl conservation. Wetlands were considered at risk for conversion if they were (1) temporary or seasonal or < 1 acre; (2) totally or partially embedded in cropland; and (3) presently not protected. These wetlands were identified using digital landcover and National Wetlands Inventory data. This information was combined with spatial models predicting duck density to create a map showing areas where wetland communities at risk of drainage support >25 pairs of breeding waterfowl per square mile (Figure 4). Of the 3,973,161 acres of unprotected wetlands in the study area, 1,457,668 acres were considered at risk, and 993,909 were considered priority (i.e., part of wetland complexes supporting > 25 pairs of breeding waterfowl per square mile). It is likely that waterbirds with similar habitat requirements have conservation priority areas similar to those identified for waterfowl, and the same methodology also could be used with spatially explicit maps of waterbird habitat to identify conservation priority areas for priority waterbird species. Grasslands also are at risk of conversion, especially with the advent of genetically modified crops (e.g., "Roundup-Ready" soybeans) that can be seeded directly into sod that has been killed with herbicide. Grasslands surrounding wetlands directly contribute to wetland and habitat quality and should also be considered in conservation planning and prioritization.

Figure 4. Waterfowl wetland conservation priority areas in the U.S. Prairie Pothole Region where at risk wetland communities support >25 pairs of breeding waterfowl per square mile.



3.3.ii Inventory and Monitoring

In addition to acquiring better bird population data, one of the first needs of an effective habitat conservation effort is an inventory of existing landcover and wetlands. Data should be standardized whenever possible and accessible to all partners. This will increase use and consistent interpretation of data, as well as promote integrated conservation across species and political boundaries.

A major data need for waterbird conservation in Canada is acquisition of a digital wetlands database similar to the National Wetlands Inventory (NWI) developed in portions of the United States. NWI data is the foundation for landscape-level understanding of waterfowl distribution and production potential in the U.S. portion of the NP&PR, and NWI data will be equally important to understanding and managing waterbirds throughout the region. In the U.S. and Canada, landcover information will need to be updated periodically to ensure accurate modeling of waterbird/habitat relationships. Current landcover information will enable us to model the effect of changes in land use, such as those caused by farm programs that dramatically alter the amount of land under cultivation, on waterbird habitat and populations. In the U.S., these data are critical to development of predictive models and maps such as those in Figures 3 and 4.

In the Canadian portion of the NP&PR, a recently initiated Habitat Monitoring Program focuses on small wetland basins lying along the transects used during the waterfowl breeding ground surveys. A pilot phase of the project has been completed in which wetland habitat mapped in 1985 was revisited in 1999 to record changes in habitat. Data are being collected in a manner intended to be applicable to several bird groups and could be used to target priority habitats for waterbirds on the prairie landscape. Upon evaluation of the suitability of this program, key wetland/upland habitat complexes for non-colonial waterbirds should be identified and included in PHJV habitat initiatives for monitoring, protection and/or enhancement. Additionally, priority landscapes for non-colonial breeders should, where applicable, be established as IBA sites with specific management plans. This program is a good example of how information needs for multiple bird groups can be gathered by one integrated program. While this program is likely to generate useful information for non-colonial marshbirds, additional habitat monitoring for colonial species is necessary.

Important colonial breeding sites should be inventoried and pertinent habitat features (e.g., water levels, islands, treed areas) identified along with species using the site, as addressed under the population monitoring section, to provide a baseline for monitoring change in site occupancy or habitat condition. Standard protocol for monitoring habitat on the colonial sites should be developed and all data should be geo-referenced for use in a GIS.

Identification and eventual designation of an IBA site is followed by development of a management plan by the local community or conservation group with an interest in the site. A component of the plan should incorporate participation of these groups in monitoring of the site. This would strengthen the IBA site and expand the volunteer base in monitoring of waterbirds and their habitats.

3.3.iii Management

Birds select habitat on several scales, and it is important to consider all scales when managing habitat. In general, the number of management options increases as scale gets finer. The coarsest scale at which birds select habitat is their range, which can be subdivided into breeding and wintering areas. There are few management options at this scale, but range overlap of different species and annual variation in species distribution (e.g., in relation to water availability) can be important considerations when making management decisions at finer scales. Geographic scale values in Table 6 provide a separation point for conservation issues that would direct actions on a landscape or local level. The Management Toolbox (Appendix I) provides specific information and resources relating to management practices and conservation programs relating to waterbirds.

3.3.iii.a Landscape-level Conservation

Landscapes are important to waterbirds for many reasons. First, an increasing body of information indicates that many waterbird species respond to wetland complexes rather than to individual wetlands. There are many reasons for this including availability of nesting and foraging habitat within the same area, increased vegetation diversity, presence of deep-water

wetlands that persist through droughts, and presence of shallow basins that are suitable for wading/foraging during wet periods. The total area and availability of foraging habitat in proximity to nest sites is especially important for species that nest in large colonies.

The composition and condition of landscapes surrounding wetlands is important to ensure the ecological integrity of wetlands. Wetlands surrounded by row-crop fields are more susceptible to siltation, fluctuations in water level, and pesticide runoff than wetlands surrounded by grasslands. Composition of predator communities also is affected by land use surrounding wetlands. Finally, uplands provide nest sites for some species of waterbirds such as American Bittern. Landscapes can be managed to a degree through protection of native habitat, restoration of large blocks of habitat (e.g., prairie restoration or woodland removal where trees have encroached on grassland), and application of agricultural programs (e.g., targeting of lands for the Conservation Reserve Program or the PHJV's Permanent Cover Program).

3.3.iii.b Managing Wetlands and Water

Waterbirds differ greatly in their response to vegetation conditions (Table 5). In some areas, wetlands are choked by vegetation due to an unnatural lack of disturbance or presence of invasive species. If necessary, fire, cattle, or herbicides can be used to reduce vegetation structure and create more open conditions. Water level manipulation also is useful for managing vegetation. Periodic drawdowns allow growth of vegetation that can be re-flooded. Alternatively, extended high water levels will kill emergent vegetation, creating more open conditions.

The PHJV and PPJV are currently conserving wetlands for waterfowl, and the needs of waterbirds should be integrated into management of these wetlands where feasible. Ongoing research regarding local and landscape-level habitat selection should provide additional insight into the types of wetlands and wetland areas that need to be managed to provide habitat for a broad variety of waterbird species.

In regions where wetland mitigation is an issue, mitigation banks should provide all the habitats and processes of the wetlands they replace. This may require creating and maintaining complexes of wetlands of variable size, type, water depth, and cover type coupled with creating suitable upland habitat. Managing water levels on reservoirs may be important in preventing the creation of ecological traps, i.e., where island-nesting birds are exposed to predators when water levels are drawn down for other uses.

3.3.iii.c Managing Uplands

Uplands are an important habitat component for many waterbird species. For those waterbirds that nest in uplands, proper cover or structure is necessary for nest sites. Uplands also provide food resources for several wetland-nesting species that feed in upland habitat.

Non-agricultural or natural habitat surrounding wetlands provides for continuity of wetland complexes and reduces the risk of runoff from agricultural practices. Grazing is an issue

that needs to be investigated in terms of its benefits and drawbacks for waterbirds, as cattle can greatly influence vegetation structure in uplands, shoreline vegetation, riparian areas, and wetlands.

Development restrictions in upland habitats near wetlands may be important to reduce direct habitat loss as well as to prevent mortality from collisions with fences and utility lines or along roads and right-of-ways. Native prairie needs to be preserved and prairie upland nesting habitats need to be managed to meet waterbird needs. Habitat managers must work with all stakeholders (landowners, grazing associations, land managers, oil/gas industry, irrigation districts, policy makers, and regulators) to ensure conservation of upland habitat.

Fire is a tool that is often used to control woody vegetation, especially on lands where habitat is not managed by grazing or other means (Appendix G). Response to fire and altered vegetative structure likely varies among species and should be evaluated in terms of benefits to targeted species and effects on non-targeted species.

3.3.iii.d Specialized Management

Waterbirds respond to a variety of local factors, including predator community composition, vegetation structure and composition, and structure and presence of nest sites. Response to local factors varies among species, but many management options are available at the local scale. For example, nesting opportunities can be enhanced by erecting nest structures for structure-nesting species such as Great Blue Heron. However, tree-like structures should not be introduced where they do not naturally occur, such as within extensive grasslands. Floating nest platforms can be placed for Black Terns, grebes, and Common Loons, and nest islands can be created for gulls, terns, American White Pelicans, and herons. When islands are created, a plan should be developed to identify species that should be using the site and whether there can be detrimental effects to other species in the area. Predator removal or exclusion can be particularly effective at colonies during the breeding season, although this is a site-specific issue that is dependent on colony accessibility and composition of local predator communities. Predator control measures should be evaluated for their effectiveness as well as their effects on other species.

3.3.iv Priority Habitat Needs

A detailed list of habitat information needs is presented in Appendix H. Priority habitat needs are as follows:

- Identify and prioritize landscapes for habitat protection for priority species.
- Identify areas providing greatest habitat benefits for multiple species.
- Prevent wetland loss through legal protection, acquisition, and conservation easements.
- Prevent upland habitat loss through legal protection, agricultural program incentives, acquisition, and conservation easements.
- Acquire digital wetlands and uplands data for all portions of the NP&PR to facilitate development of spatial planning tools.

- Manage water where appropriate to provide suitable habitat for waterbirds.
- Manage water quality by preventing runoff (siltation) and contamination.
- Reduce disturbance and recreation impacts on waterbirds.

3.4 Priority Research Needs

A primary conclusion of the NPPWCP is the realization that very little is known about waterbirds in the region. Considerable research is needed to provide better direction for conservation planning. Because of their similar needs, we have combined colonial and non-colonial species in the section below. A further—but by no means complete—listing of potential research questions is noted in Appendix H. Priority research needs for the NP&PR include:

- Development of accurate distribution, abundance, and population trend data for all species, particularly non-colonial waterbirds.
- Determination of habitat requirement at the local and landscape levels for all waterbirds with focus on priority species.
- Developing an understanding of factors affecting adult survival and productivity.
- Establishing and evaluating standard protocols for surveys, especially in relation to regional issues and local challenges.
- Understanding the impacts of diseases such as avian botulism.
- Increase our understanding of the influence of environmental conditions, particularly water conditions, on dispersal and population shifts of waterbirds.
- Developing an understanding of the relative role of breeding, staging, and wintering grounds on waterbird populations (e.g., knowing where the bottlenecks are and who will address them). These issues will need to be addressed at a broader scale than the NP&PR waterbird plan.
- Acquire knowledge of the response of different waterbirds to various management treatments.
- Creating an expanded spatial context for waterbirds, e.g., how they respond to natural and human-induced environmental changes, and how changing waterbird populations, especially new, large colonies of gulls, affect other species, particularly shorebirds.

3.5 Integration

A key component of the plan is integration of conservation planning. Integration has many components, including species, scales, and jurisdictions. State and provincial status listings were very similar for many priority species in the NP&PR, and our planning promotes a common approach to conservation of these species. However, integrated waterbird planning across borders is not entirely new in the region. The U.S. Fish and Wildlife Service, Canadian Wildlife Service, Central Flyway, and state and provincial wildlife agencies already cooperate in planning and surveying for migratory bird species that are hunted. The PHJV and the PPJV coordinate wetland conservation across landscapes for waterfowl and non-game species. Development of one waterbird plan under the PPJV and the PHJV will ensure international consistency, but joint ventures will need to tailor implementation according to different realities in the U.S. and Canada. Integrated conservation in the two joint ventures is only part of the story, though,

as waterbirds breeding in the NP&PR spend only a portion of their annual cycle there, and migration corridors, staging areas, and wintering grounds also are vital to their conservation. Continental planning efforts must recognize and support conservation linkages between different geographic regions.

The waterbird conservation approach with the greatest potential in the NP&PR will be integration with conservation plans for other species. As mentioned previously, one of the primary planning tools is the development of landscape-level habitat models. Spatially explicit maps predicting presence and density of waterbirds can be combined with maps predicting presence of other species of interest such as waterfowl, shorebirds, and grassland birds. Preliminary analyses indicate considerable potential for waterbird conservation efforts to overlap with conservation efforts for waterfowl, shorebirds, and grassland birds in the region, but planning also must consider areas where there is little or no overlap to ensure that all species of conservation concern are adequately covered. Integration among bird conservation plans can be achieved in many ways, such as present efforts in Alberta to determine waterbird habitat relationships by combining waterbird surveys with wetland and habitat information from waterfowl surveys. Conservation planning in the NP&PR focuses on a landscape approach and broad-scale relationships, but local effects and management also must be considered, as fine-grained habitat selection in a given landscape can differ among species. For instance, wetlands with large amounts of tall, dense, emergent vegetation used by rails will be avoided by breeding shorebirds such as Marbled Godwit, which prefer wetlands with little or no tall emergent vegetation.

Because of the diversity of the waterbird group, limited knowledge of waterbirds, and limited funds for understanding waterbird populations and habitat relationships, it will be necessary for waterbird conservation planning and management to make use of existing programs and data wherever possible. Many lessons can be learned from waterfowl conservation planning and management, which has been taking place in the NP&PR for more than half a century. May waterfowl breeding ground surveys can provide information on wetland characteristics and pond numbers, and the variety of existing waterfowl surveys can provide considerable information on survey and sampling techniques, some of which may be applicable to waterbirds. The BBS can provide much useful information, especially if all routes are surveyed annually and BBS data can be linked to water conditions and habitat. Habitat modeling can be used to assess the importance of landscapes and wetland complexes to waterbirds. For species where landscape-level modeling is appropriate, spatially explicit models and maps can identify priority areas for conservation, similar to those presently used for waterfowl. Overlays of multiple models will allow planners to identify areas of value to multiple species, which will help integrate conservation across species. Sharing data and protocol among agencies will help integrate conservation planning across political boundaries.

Integrated conservation will not happen by itself. Individuals and organizations must be dedicated to improvement and implementation of the plan. Whenever possible, linkages with other species and conservation efforts must be identified and developed. Consumptive and non-consumptive recreational opportunities involving waterbirds should be cultivated and promoted. Waterfowl hunters contribute huge amounts of money for wetland conservation, and

waterfowl organizations are already considering waterbirds in their conservation efforts. By working cooperatively with consumptive users and conservation agencies, habitat can be secured for many waterbird species, including non-game species. Sustainable hunting is dependent, of course, on careful regulation to ensure that harvest does not detrimentally impact populations of hunted waterbirds. The NP&PR is vitally important to many waterbird species, just as it is to many waterfowl species; that realization must be communicated to non-consumptive users as well as to consumptive users. Promoting bird watching in the NP&PR could mesh well with programs to develop a broader economic base in the region. Identification of Important Bird Areas is one step in promoting non-consumptive use of waterbirds.

4.0 COMMUNICATION

Implementing the NPPWCP will require the inclusion of partners from private and governmental sectors. Little is known about waterbirds even within the scientific community, and it will be necessary to communicate goals and key messages to target audiences. In the course of plan development, we have identified the following goals, audiences, and messages along with potential activities to aid communication.

4.1 Communication Goals

- Increase understanding, awareness, and appreciation of wetlands and waterbirds in the NP&PR and the plight of wetland ecosystems in general. Build support for waterbird conservation efforts and wetland and upland habitat protection.
- Increase awareness of conservation initiatives that not only benefit waterbirds but all water-dependent species.

4.2 Target Audiences

- Habitat delivery and management agencies.
- Various levels of government (i.e., regulators, resource managers, and policy makers).
- Resource users, land management agencies, municipalities, and non-governmental organizations.
- Private landholders and community leaders.
- General public.

4.3 Key Messages

- Benefits of wetlands to ecosystem functions.
- Activities of conservation groups/agencies.
- Importance of the wetland complex.
- The dynamic and ephemeral nature of prairie wetlands.
- Importance of the NP&PR to continental waterbird populations.
- Ease of involvement, including surveys, IBA designation, wetland enhancement, habitat preservation, and ecotourism development.
- The importance of upland management to wetland ecosystems and waterbird populations.

- Facts behind fisheries issues.
- Change in predator communities.
- Availability of key resources, including the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife program and the U.S. Department of Agriculture's Natural Resources Conservation Service.
- Communication within the natural resources professions.

4.4 Communication Activities

An extensive list of communication activities is provided on page 36 of the continental waterbird plan, available at www.waterbirdconservation.org.

- Many agencies, organizations, and groups are involved with communication of wetland issues. Efforts should be coordinated to maximize communication efficiency and encourage frequent communication through relevant media. Media releases involving other partners should be reviewed by them in advance. Articles should be shared with the team in a timely fashion.
- Recruitment through outreach programs: local naturalists, IBA local community, and conservation groups can assist in inventory and monitoring of waterbirds.
- Development of information kits or websites, possibly including a PowerPoint presentation.
- Workshops to promote and advance waterbird monitoring.
- Promote other group or agency activities on monitoring of all bird species (e.g., bird checklist programs or nest record schemes).

5.0 PARTNERSHIPS AND NEXT STEPS OF THE NORTHERN PRAIRIE AND PARKLANDS WATERBIRD CONSERVATION PLAN

5.1. Working Group Organization, Leadership, and Partnerships

Implementation of the NPPWCP provides the opportunity for many groups and individuals to partner and develop an integrated, landscape approach to waterbird conservation. The PHJV and PPJV are committed to integrated bird conservation and will form the base upon which implementation of the plan will be built and expanded to include a broader range of stakeholders. Given the voluntary nature of joint ventures and present lack of support for waterbird conservation, it is difficult to identify specific roles and assign duties for more than a few tasks. In the U.S., the Habitat and Population Evaluation Team (HAPET) offices in Bismarck, North Dakota and Fergus Falls, Minnesota will be responsible for development of spatial planning tools and evaluation and implementation of regional waterbird surveys. In Canada, the lead on Species At Risk waterbirds will be the Canadian Wildlife Service. Gerald McKeating of Bird Studies Canada will serve as the liaison between the Northern Prairie and Parkland Region and the continental Waterbird Conservation Council. Priority tasks from Section 3 will be assigned and duties assumed as resources become available and partners step forward.

5.2. Implementation Process and Adaptive Planning

The purpose of this plan was to synthesize and assess information, identify information needs,

and prioritize conservation issues with the end goal of guiding waterbird conservation in the NP&PR. Actual implementation of the plan is an additional step that will need to be undertaken by partners within the NP&PR. As mentioned above, an excellent conservation base and partnership network exists in the NP&PR with the Prairie Habitat and Prairie Pothole joint ventures, both of which are committed to the conservation of waterbirds as well as waterfowl. In addition, programs such as NAWCA are available to support conservation efforts. In many cases, local treatments (see Management Toolbox, Appendix I) can help conserve waterbirds. However, given the breadth and scope of this plan, widespread implementation will be gradual as regional money and opportunities become available and continental programs are developed and coordinated.

Throughout the implementation process, it must be remembered that the NPPWCP was developed with limited information, and that goals, methodologies, and expectations will change as new information becomes available. In addition, environmental and economic conditions in the NP&PR are highly variable. For these reasons, it is imperative that the plan be flexible and updated periodically. Ideally, assumptions and uncertainties should be addressed in an adaptive fashion where experimental treatments can be assigned and responses assessed, rather than simply reacting to changes.

5.3 Measuring the Success of Implementation of the Northern Prairie & Parkland Waterbird Conservation Plan

The ultimate measure of success of the NPPWCP will be how well it meets the stated goal "To provide guidelines for conservation that, when implemented, result in maintaining and managing healthy populations, distributions, and habitats of waterbirds throughout the Northern Prairie & Parkland Region of North America." Of course, accurately assessing healthy populations, distributions, and habitats for all species of waterbirds throughout the NP&PR is, at this point, an impossibility. However, given the historic lack of interest in waterbirds in the region, achievement of any of several key tasks will be milestones in implementation of the plan, including:

- Initiation of a standardized, region-wide monitoring program for colonial and non-colonial species that is linked to national and North American strategies.
- Development of statistically sound, defensible estimates of distribution, abundance, and population trends for key waterbird species in the NP&PR, particularly marshbirds.
- Understanding habitat requirements at local and landscape levels for priority waterbird species.
- Development of a standardized, readily accessible database in which to store population survey data.
- Completion of NP&PR-wide wetland inventory.
- Completion of NP&PR-wide upland habitat inventory, to be updated at regular intervals.
- Development of NP&PR-wide spatially explicit habitat models for non-colonial waterbirds.
- Obsolescence of large portions of the NPPWCP due to acquisition of new information.

6.0 GLOSSARY

Bird Conservation Region (BCR) 11: one of 37 physiographic regions defined by the North American Bird Conservation Initiative as a geographic unit for planning and implementation of bird conservation efforts. BCR 11 approximates the NP&PR.

Colonial Waterbird: waterbird species that nests in groups, typically on islands, bare spits of land, emergent wetland vegetation, trees, or other structures. Colonies may consist of one or multiple species, and may range from a few to tens of thousands of individuals. The degree of coloniality varies, even within a species, as inter-nest distance may vary from less than a meter to tens of meters. Pelicans, cormorants, gulls, terns, and most grebes and herons are colonial. These species were addressed at the continental level by Volume I of the NAWCP.

Joint Venture (JV): joint ventures are regional, cooperative entities set up as part of the North American Waterfowl Management Plan to coordinate waterfowl management by member groups and agencies. The duties of joint ventures have since been expanded to coordinate conservation of non-waterfowl species covered by other bird conservation initiatives. The NP&PR contains the Prairie Habitat Joint Venture in Canada and the Prairie Pothole Joint Venture in the U.S. Joint ventures are particularly important to waterbirds because of their emphasis on wetland habitats and their role in implementing conservation plans.

Marshbird: a waterbird that nests in wetland vegetation. Marshbirds are often considered non-colonial (e.g., rails, American Coot, Common Moorhen, cranes, and some grebes) but some colonial species (e.g., Black Tern, Eared Grebe, and Western Grebe) are marsh-nesting species.

Non-colonial Waterbird: a waterbird that nests singly, typically in extensive wetland vegetation. Rails, American Coot, Common Moorhen, cranes, and some grebes and herons are non-colonial waterbirds, although they are often referred to as marshbirds. Some species may appear semi-colonial when they are concentrated in pockets of good habitat. Noncolonial waterbirds will be addressed at the continental level by volume II of the NAWCP.

North American Bird Conservation Initiative (NABCI): an umbrella organization for continental bird conservation plans including Partners in Flight, the North American Waterbird Conservation Plan, the North American Waterfowl Management Plan, and the Canadian and U.S. shorebird conservation plans.

North American Waterbird Conservation Plan (NAWCP): the NAWCP was developed to provide a framework for the conservation and management of 210 species of seabirds, coastal waterbirds, wading birds, and marshbirds. The plan area includes the interests of 29 nations and international waters surrounding North America, Central America, and the northern tip of South America. See www.waterbirdconservation.org for more information.

North American Waterfowl Management Plan (NAWMP): NAWMP is a joint effort by Mexico, the U.S., and Canada designed to ensure the recovery and perpetuation of waterfowl habitat and populations in North America. Because of its focus on wetland habitat, NAWMP is of critical importance to waterbirds.

Northern Prairie & Parkland Region (NP&PR): a physiographic region extending roughly from central Alberta to central Iowa, characterized by numerous wetland basins created by glacial action. The NP&PR is a planning region defined by the North American Waterbird Conservation Plan and consists of those areas covered by the Prairie Pothole Joint Venture (PPJV) in the United States and the Prairie Habitat Joint Venture (PHJV) in Canada. The NP&PR approximates the boundary of BCR 11.

Permanent Wetland: a wetland in which surface water is present throughout the year in all years.

Prairie Habitat Joint Venture (PHJV): the joint venture or partnership implementing waterfowl and wetland conservation under NAWMP on the Canadian prairies.

Prairie Pothole Joint Venture (PPJV): the joint venture or partnership implementing waterfowl and wetland conservation under NAWMP on the Northern Prairie & Parkland Region of the United States.

Seasonal Wetland: a wetland in which surface water is present for extended periods, especially early in the growing season, but is absent by the end of the season in most years.

Semi-permanent Wetland: a wetland in which surface water persists throughout the growing season in most years. When surface water is absent, the water table is at or near the soil surface.

Temporary Wetland: a wetland in which surface water is present for brief periods during the growing season, but the water table is otherwise well below the soil surface.

Waterbird: for purposes of the North American Waterbird Conservation Plan, the term "waterbird" includes all colonial and non-colonial seabirds, wading birds, gulls, terns, pelicans, and marshbirds. Waterfowl, shorebirds, and wetland-associated passerines (e.g., Marsh Wren, Nelson's Sharp-tailed Sparrow) and raptors (e.g., Osprey, Bald Eagle) are not included in continental or regional waterbird plans.

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8.0 Appendices

APPENDIX A. WATERBIRDS OF THE NORTHERN PRAIRIE & PARKLAND REGION.

Waterbird species documented to occur in the NP&PR and their status. Status varies among jurisdictions; for instance, Sandhill Crane is listed as a breeder in several states and provinces, even though it is a common breeder in Saskatchewan and a rare breeder in North Dakota.

	State or Province								
SPECIES	AB	SK	MB	MT	ND	SD	MN	IA	BCR*
Red-throated Loon	C	C		C	C	C			C
Pacific Loon	C	C			C	C	C		C
Common Loon	B	B	B	M	B	M	B	M	B
Yellow-billed Loon	C	C		C	C				C
Pied-billed Grebe	B	B	B	B	B	B	B	B	B
Horned Grebe	B	B	B	B	B	B	B	M	B
Red-necked Grebe	B	B	B	M	B	B	B	M	B
Eared Grebe	B	B	B	B	B	B	B	B	B
Western Grebe	B	B	B	B	B	B	B	M	B
Clark's Grebe	B	B	B	B	B	B	M		B
American White Pelican	B	B	B	B	B	B	B	M	B
Brown Pelican					C	C			C
Neotropic Cormorant		C							C
Double-crested Cormorant	B	B	B	B	B	B	B	B	B
American Bittern	B	B	B	B	B	B	B	B	B
Least Bittern		C	B	C	B	B	B	B	B
Great Blue Heron	B	B	B	B	B	B	B	B	B
Great Egret	C	B	B	C	B	B	B	B	B
Snowy Egret	C	C	C	C	B	B	M	C	B
Little Blue Heron	C	C		C	B	B	M		B
Tricolored Heron	C	C			B	B	C		B
Cattle Egret	C	B	C	C	B	B	M	C	B
Green Heron	C	C	C	C	B	B	B	B	B
Black-crowned Night-Heron	B	B	B	C	B	B	B	B	B
Yellow-crowned Night-Heron		C			C	C	M	C	C
Wood Ibis						C			C
Glossy Ibis		C					C		C
White-faced Ibis	B	B		B	B	B	B		B
White Ibis					C	C	C		C
King Rail					C	B	B	B	B
Virginia Rail	B	B	B	B	B	B	B	B	B
Sora	B	B	B	B	B	B	B	B	B
Yellow Rail	B	B	B	C	B	M	B		B
Black Rail									C
Common Moorhen					C	B	B	B	B
American Coot	B	B	B	B	B	B	B	B	B
Sandhill Crane	B	B	B	B	B	M	B	B	B

continued on next page

Appendix A, *continued*

SPECIES	AB	SK	MB	MT	ND	SD	MN	IA	BCR*
Common Crane	C	C							C
Whooping Crane	C	M	C	C	M	M	C	C	M
Pomarine Jaeger	C	C		C	C	C			C
Parasitic Jaeger	C	C			C				C
Long-tailed Jaeger	C	C			C	C	C		C
Laughing Gull		C			C	C			C
Franklin's Gull	B	B	B	B	B	B	B	B	B
Little Gull		C	C		C		C		C
Black-headed gull							C		
Bonaparte's Gull	B	B	B	M	M	M	M	M	B
Mew Gull	B	C		C	C				C
Ring-billed Gull	B	B	B	B	B	P	B	M	P
California Gull	B	B	B	B	B	B	C		B
Herring Gull	B	B	B	B	M	W	M	M	B
Thayer's Gull	C	M		C	M				M
Iceland Gull	C	C		C	C				C
Lesser Black-backed Gull		C			C				C
Slaty-backed Gull		C							C
Glaucous-winged Gull	C	C		C	C				C
Glaucous Gull	C	M		C	M	W			W
Great black-backed Gull		C		C					C
Sabine's Gull	C	C			M	C			C
Black-legged Kittiwake	C	C			M	W	C		C
Ross' Gull		C			C		C		C
Ivory Gull		C		C					C
Caspian Tern	B	B	B	B	B	C	M	M	B
Common Tern	B	B	B	B	B	B	M	M	B
Arctic Tern	C	C			C				C
Forster's Tern	B	B	B	B	B	B	B	B	B
Least Tern		C		B	B	B	C	B	B
Black Tern	B	B	B	B	B	B	B	B	B
Black Guillemot	C	C							C
Pigeon Guillemot		C							C
Long-billed Murrelet	C	C							C
Ancient Murrelet	C	C		C			C		C
BREEDING (B)	28	29	28	23	33	30	26	19	36
REGULAR-MIGRANT (M)	0	3	0	3	7	5	9	10	2
REG.-SUMMER VISITANT (V)	0	0	0	0	0	0	0	0	0
REG.-WINTER VISITANT (W)	0	0	0	0	0	3	0	0	1
BR.-WINTER VISITANT (P)	0	0	0	0	0	1	0	0	1
CASUAL/ACCIDENTAL (C)	24	33	5	20	19	11	13	4	31
TOTAL	**52**	**65**	**33**	**46**	**59**	**50**	**48**	**33**	**71**

*Status for the BCR was assigned with the ranking P>B>W=V>M>C using status categories defined above.

APPENDIX B. EXISTING MONITORING PROGRAMS AND DATABASES

This appendix provides additional information about existing monitoring programs, as well as web sites and contacts for some programs. Many of the programs here are general, rather than specifically for waterbirds. Contact information was current at the time of plan development.

The Breeding Bird Survey provides considerable information about North American birds, including waterbirds. For population distribution and trend information available in map or tabular format, visit **www.mbr-pwrc.usgs.gov/bbs/bbs.html**. Raw data can also be downloaded from the BBS, with the ability to search by route(s), species, region(s), and year. For more information, visit **www.mp2-pwrc.usgs.gov/bbs/retrieval/menu.cfm**.

Cornell's Nest Record Card program is a database containing records of bird nests from across the continent. The program formally began in 1965, but has some records dating to the late 1800s. Data in the program are not presently available via the Internet; Jim Lowe at Cornell University is the contact.

Most states and provinces maintain Natural Heritage or Conservation databases. Type, quality, and availability of data vary among programs, but our experience has been that staff at natural heritage programs are extremely helpful in providing data. In many cases, data requests can be entered and even processed on-line. Web addresses are in **bold** below.

Iowa: **www.inhf.org**
Minnesota: **www.dnr.state.mn.us/ecological_services/nhnrp/index.html**
South Dakota: **www.state.sd.us/gfp/Diversity**
North Dakota: **www.natureserve.org/nhp/us/nd**
Montana: **nhp.nris.state.mt.us**
Manitoba: **web2.gov.mb.ca/conservation/cdc**
Saskatchewan: **www.biodiversity.sk.ca**
Alberta: http: **www.cd.gov.ab.ca/preserving/parks/anhic/flashindex.asp**

The Patuxent Wildlife Research Center maintains a continental bird point count database that is searchable by species, geography, and habitat. Point count data can be entered into the database via the web, as well as retrieved. For more information, go to **www.mp2-pwrc.usgs.gov/point/**.

In Alberta the Federation of Alberta Naturalists (FAN) is facilitating a Bird Checklist program and recently initiated a program to update the Alberta Breeding Bird Atlas. Observations of all birds observed by naturalists for a specific location and time period is forwarded to FAN, which maintains a database on observations across the province. Visit **www.fanweb.ca** for more information.

The Prairie Nest Record Scheme, a volunteer-based program, provides a database for records that includes distribution and phenology (nest initiation and fledging) of all breeding birds across the Canadian prairie landscape including waterbirds. Visit **www.mb.ec.gc.ca/nature/migratorybirds/dc00s05.en.html** for more information.

The Northern Prairie Wildlife Research Center has a variety of checklists, distribution information, literature reviews, and management techniques available via their web site, some of which relate to waterbirds. Visit **www.npwrc.usgs.gov/resource/taxa_N.htm** for more information.

Many states have GAP analysis programs that document patterns of species distribution and diversity and to what extent species are protected. However, many GAP habitat models are of low quality for conservation planning. For more information about GAP, including links to state projects and how to acquire GAP products, visit **www.gap.uidaho.edu/Projects/default.htm**.

APPENDIX C. STATUS OF WATERBIRDS IN THE NORTHERN PRAIRIE & PARKLAND REGION BY JURISDICTION

All species are included in the Migratory Birds Treaty (Convention) Act in the U.S.; in Canada, White Pelican and Double-Crested Cormorant receive provincial protection but are not included in the Migratory Birds Treaty (Convention) Act. Abbreviations listed below.

Species	COSEWIC*	ESA**	Alberta	Saskatchewan	Manitoba	Montana	North Dakota	South Dakota	M innesota	Iowa
Common Loon	NAR, AB/SK/MB		Sec	Sec	S4	SC	Rare			
Pied-billed Grebe			Sen	Sen	S4S5					
Horned Grebe			Sen	Sen	S4S5				Thr	
Red-necked Grebe	NAR, AB/SK/MB		Sec	Sec	S4S5		Rare			
Eared Grebe			Sec	Sec	S4S5					
Western Grebe			Sen	Sec	S4					
Clark's Grebe			Sen	Sen	S2					
American White Pelican	NAR, AB/SK/MB		Sen	Sen	S3	SC			SC	
Double-crested Cormorant	NAR, AB/SK/MB		Sec	Sec	S4					
American Bittern			Sen	Sen	S4					
Least Bittern	Thr, MB		Sen	AV	S3					
Great Blue Heron			Sen	Sen	S4					
Great Egret			AV	AV	S2					
Snowy Egret			AV	AV	SA					
Little Blue Heron			AV	AV	SA					
Tricolored Heron			AV	AV	SA					
Cattle Egret			AV	AV	PB		Rare			
Green Heron			AV	AV	S1S2		Rare			
Black-crowned Night-Heron			Sen	Sen	S3S4	SC				
Yellow-crowned Night-Heron			AV	AV	SA					
White-faced Ibis			Sen	AV	SA	SC	Rare			
Yellow Rail	SC, AB/SK/MB		Und	Sen	S4	SC	Rare		SC	
Black rail			NA	AV	SR					
King Rail			NA	AV	SA				Endg	Endg
Virginia Rail			Und	Sen	S4					
Sora			Sec	Sec	S5					

Continued

Appendix C continued

Species	COSEWIC*	ESA**	Alberta	Saskatchewan	Manitoba	Montana	North Dakota	South Dakota	Minnesota	Iowa
Common Moorhen			NA	AV	SA				SC	
American Coot	NAR,AB/SK/MB		Sec	Sec	S5					
Sandhill Crane	NAR, MB (Greater)		Sen	Sec	S5		Rare			
Whooping Crane	Endg, NT/AB	Endg	AR	AR	Endg	Endg	Endg	Endg		
Franklin's Gull			Sec	Sen	S4S5	SC			SC	
Bonaparte's Gull			Sec	Sec	S5					
Ring-billed Gull			Sec	Sec	S5					
California Gull			Sec	Sec	S4					
Herring Gull			Sec	Sec	S5					
Caspian Tern	NAR, AB/SK/MB		Sen	Sen	S3	SC				
Common Tern	NAR, AB/SK/MB		Sec	Sen	S4S5	SC	Rare		Thr	
Forster's Tern	DD, AB/SK/MB		Sen	Sen	S3S4	SC	Rare		SC	SC
Least Tern		Endg	NA	AV	SA	Endg	Endg	Endg		Endg
Black Tern	NAR, AB/SK/MB		Sen	Sen	S3S4	SC				SC

*Committee on the Status of Endangered Wildlife in Canada
**U.S. Endangered Species Act

AB: Alberta
AR: At Risk
AV: Accidental/Vagrant
DD: Data Deficient
Endg: Endangered
MB: Manitoba
NA: Not Applicable
NAR: Not at Risk
PB: Potential Breeder
S1S2: Very Rare
S2: Rare
S3: Uncommon
S3S4: Uncommon
S4: Apparently Secure
S5: Secure
SA: Accidental
SC: Species of Concern
Sec: Secure
Sen: Sensitive
SK: Saskatchewan
SR: Reported
Thr: Threatened
Und: Undetermined

APPENDIX D. SPECIES ACCOUNTS FOR WATERBIRDS IN THE NORTHERN PRAIRIE & PARKLAND REGION

These accounts were developed to provide users of this plan with a summary of pertinent biological information for waterbirds of the Northern Prairie & Parkland Region. For each species, we have provided the common name followed by the scientific name. The next line provides the French name, followed by the Spanish name. French and Spanish common names were taken primarily from the Birds of North America accounts. Spanish names, in particular, vary among regions, and in some cases we have provided two Spanish names separated by a slash.

The accounts are divided into several sections. The first is a status summary, which provides the regional conservation vulnerability status for all species in the NP&PR (Section 2.5 of the plan); continental conservation status is listed for colonial and semi-colonial species, but is not yet available for non-colonial nesters. For some species such as Snowy Egret and Little Blue Heron, regional conservation priorities are much lower than continental priorities because these species are peripheral breeders in the NP&PR. Much of the status information is based on analysis of BBS data from BCR 11, which approximates the boundary of the NP&PR, over the period 1966-2000. BBS data are admittedly poor for many waterbird species, but the BBS is the best that is available in most cases. For information on how trend data were analyzed, visit **www.mbr-pwrc.usgs.gov/bbs/trendin.html**. Some of the numbers in the status summary were developed and compiled by the Manomet Science Center and the Rocky Mountain Bird Observatory.

Following the status summary is a summary of the regional and global occurrence of each species, along with its habitat requirements. Much of this information was gleaned from Birds of North America accounts and local studies; but again, the ecology of many of these species in the NP&PR is poorly understood and many knowledge gaps remain. Issues, existing actions, research needs, and action needs follow. For many harvested species, research and action needs applicable to the NP&PR were incorporated from Tacha and Braun's (1994) "Migratory Shore and Upland Game Bird Management in North America." The list of needed actions varies considerably among species, due in large part to differential knowledge of species and knowledge and interests of the people who volunteered to write the accounts. So little is known about some species in the region that we can't identify limiting factors and issues that need to be addressed, and often no existing actions are known to be occurring. However, population conservation is the top priority for all species, which is typically accomplished through habitat conservation. Preservation of habitat is obviously a top priority action for most species, but is not listed for every species, particularly when habitat needs are poorly known. Similarly, a better understanding of population size and distribution is needed for almost all species, along with appropriate surveys to acquire that information.

A contact person is provided for most species. People were included if they are an expert on the species, have some job responsibility for the species (e.g., flyway representatives for hunted species), or have a large number of the species under their jurisdiction. Contacts will change with retirements, changes in jobs, and changes in duties, so we have provided general contact information and suggest consulting a flyway directory or the Internet for specific contact information.

Key references, including the pertinent chapter from the "Birds of North America," follow each species account. The applicable chapter from Tacha and Braun's (1994) "Migratory

Shore and Upland Game Bird Management in North America" is listed for hunted species. Finally, references are provided for regional, national, and continental status assessments and conservation plans that have been developed for key species. In addition, a literature review entitled "Effects of Management Practices on Wetland Birds" is being developed by Northern Prairie Wildlife Research Center; these excellent accounts are accessible at Northern Prairie's website at **www.npwrc.usgs.gov/resource/literatr/wetbird/wetbird.htm**. Reviews are presently available for American Bittern, Yellow Rail, Virginia Rail, Sora, and Black Tern.

Finally, range maps are provided for each species, with a GIS overlay showing the boundaries of the Northern Prairie & Parkland Waterbird Conservation Region. Ranges of some waterbird species in the region are poorly known or are changing, and range maps cannot, and will not, be perfectly accurate. In a few cases, mapped breeding range is outside the NP&PR, even though breeding has recently taken place in the NP&PR. For some waterbird species, breeding sites are very local within the breeding range shown on the maps. Also, breeding occurs in year-round range for some species, which might not be shown on the NP&PR breeding distribution map for some species. Accounts are presented in phylogenetic sequence.

Common Loon – *Gavia immer*
Plongeon huard- Colimbo mayor/Colimbo Común

***Status Summary**:*

Regional conservation vulnerability: **Low Risk**

Population trend	[3]
Relative abundance	[4]
Threats to breeding	[2]
Threats to non-breeding	[3]
Non-breeding distribution	[2]
Area importance of BCR11	[1]

Continental and BCR11 populations	500,000-700,000; Unknown
Population trend in BCR11	[3.9%/yr., p = 0.15]
Population trend in North America	[2.9%/yr., p = 0.0001] Significant increase of 95.4% (P < 0.01) for 1966-1993
Abundance status in BCR11	Uncommon.
BCR11 % of continental population	< 1%

Occurrence in NP&PR: Non-colonial. Uncommon as a breeder in the northern and eastern portions of region. Uncommon migrant and occasional summer resident further to the south and west.

Habitat requirements: Generally clear, variety of fish- and non-fish-bearing lakes of the boreal and mixed wood forests and parklands (Alberta) northward into the sub-arctic tundra. For nesting, prefers small islands (<2.5 ha) to mainland sites, usually in marshy areas of lakes with shallow water (<0.5 m). Uses rivers and reservoirs during migration. Winters primarily in coastal marine environments.

Global distribution: Breeds across North America from the northern United States northward into the sub-arctic tundra. Also in Greenland and Iceland. Has nested in Scotland and Bear Island. Winters along Pacific coast from the Aleutians to Baja California, along Atlantic and Gulf coasts from Newfoundland to Florida, west to Texas, and in Palearctic along Atlantic coast to northwestern Africa.

Issues in NP&PR:

- Has retreated from southern portion of range.
- Disturbance associated with waterfront development and recreation can reduce recruitment.
- Contaminants (e.g., mercury) have been identified as a threat in other regions.

Existing action:

- 250 lakes are surveyed annually for occupancy and productivity in three index areas in Minnesota.
- Partial survey has recently been completed in Canada as part of Bird Studies Canada's Loon Lakes Survey.

Action needed:

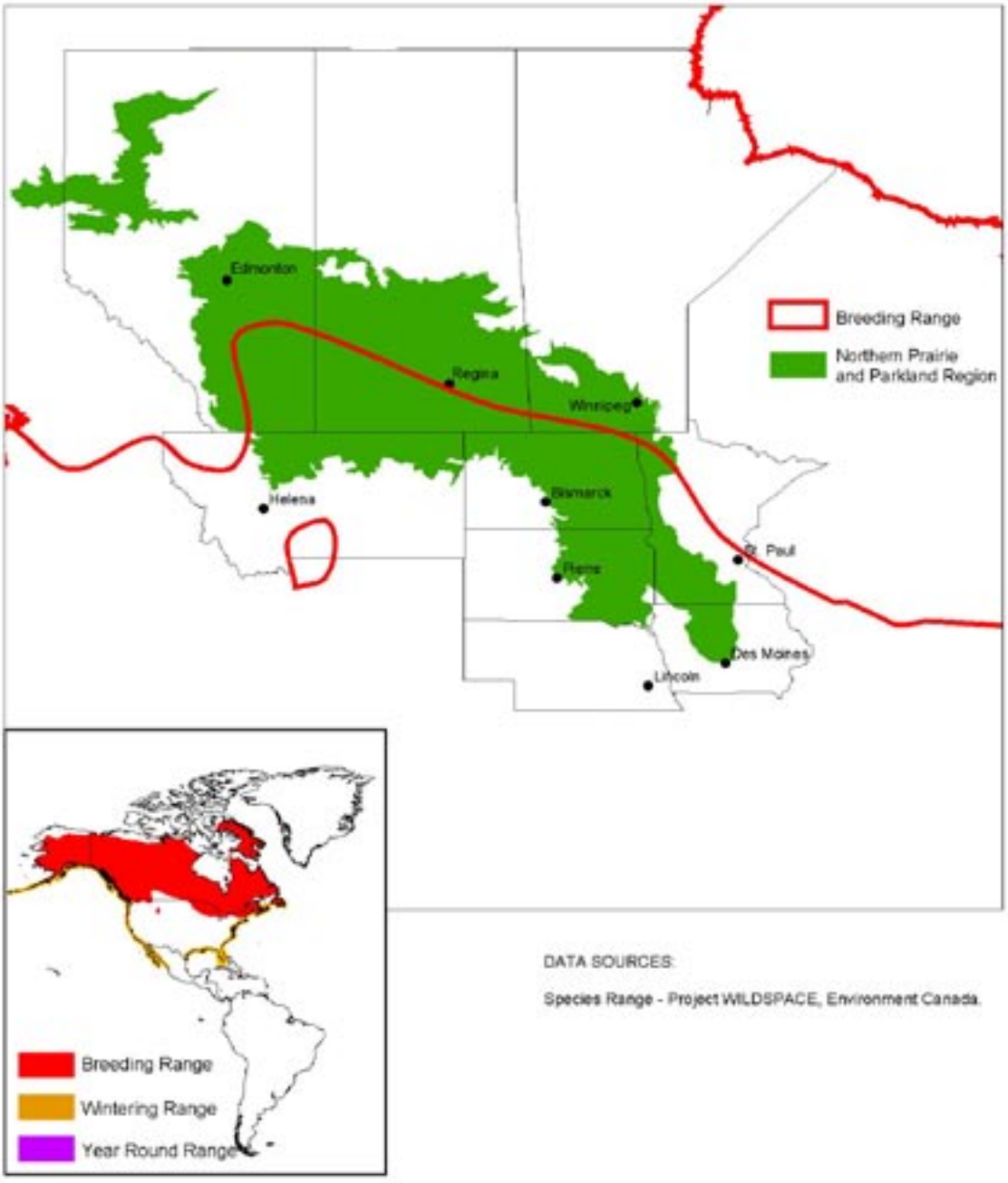
- As this species is on the region's fringe, no extensive action would be required; however, a broad survey would help determine current populations and distribution and provide a baseline for following population trends.

***Primary regional contacts**:* Katie Haws, Minnesota DNR; Bev Gingras, CWS.

Reference:

McIntyre, J. W., and J. F. Barr. 1997. Common Loon. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 313. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Common Loon Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Pied-billed Grebe – *Podilymbus podiceps*
Grebe a bec bigarre – Zambullidor piquigrueso/Zambullidor Piquipinto

***Status Summary**:*

Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[4]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[1]
Area importance of BCR11	[5]

Continental and BCR11 populations	Unknown
Population trend in BCR11	[6.72%/yr, p = 0.02]
Population trend in North America	[2.1%/yr, p = 0.05]
Abundance status in BCR11	Common
BCR11 % of continental population	>50%

Occurrence in NP&PR: Pied-billed Grebe nests throughout NP&PR, with greatest numbers occurring in west-central Minnesota, eastern South Dakota, central North Dakota, and southeastern Saskatchewan. Nests are typically solitary with males defending territories.

Habitat requirements: Found on seasonal or permanent wetlands $\geq$ 0.2 ha with dense emergent vegetation for nesting with open water nearby for foraging. Wetlands are typically fresh, but can be moderately brackish. Pied-billed Grebes nest over water on platforms of decaying vegetation. Diet consists of fish, crustaceans, and aquatic insects.

Global distribution: Restricted primarily to North America, this species nests from northern and central Canada as far south as central Chile and southern Argentina. The northern edge of their winter range extends from southern British Columbia in the west, through central Missouri to southern New York in the east, and extends south through North and Central America. Considered a vagrant in Hawaii and Europe.

Issues in NP&PR:

- Likely affected by habitat loss. Specific issues unknown.

Existing action:

- Monitoring of this species has been incorporated in the annual May Waterfowl Breeding Surveys in the Canadian prairies during the past couple of years.
- Detected in small numbers by the Breeding Bird Survey.

Action needed:

- Identify and target high priority landscapes and habitats for conservation action.

Research needed:

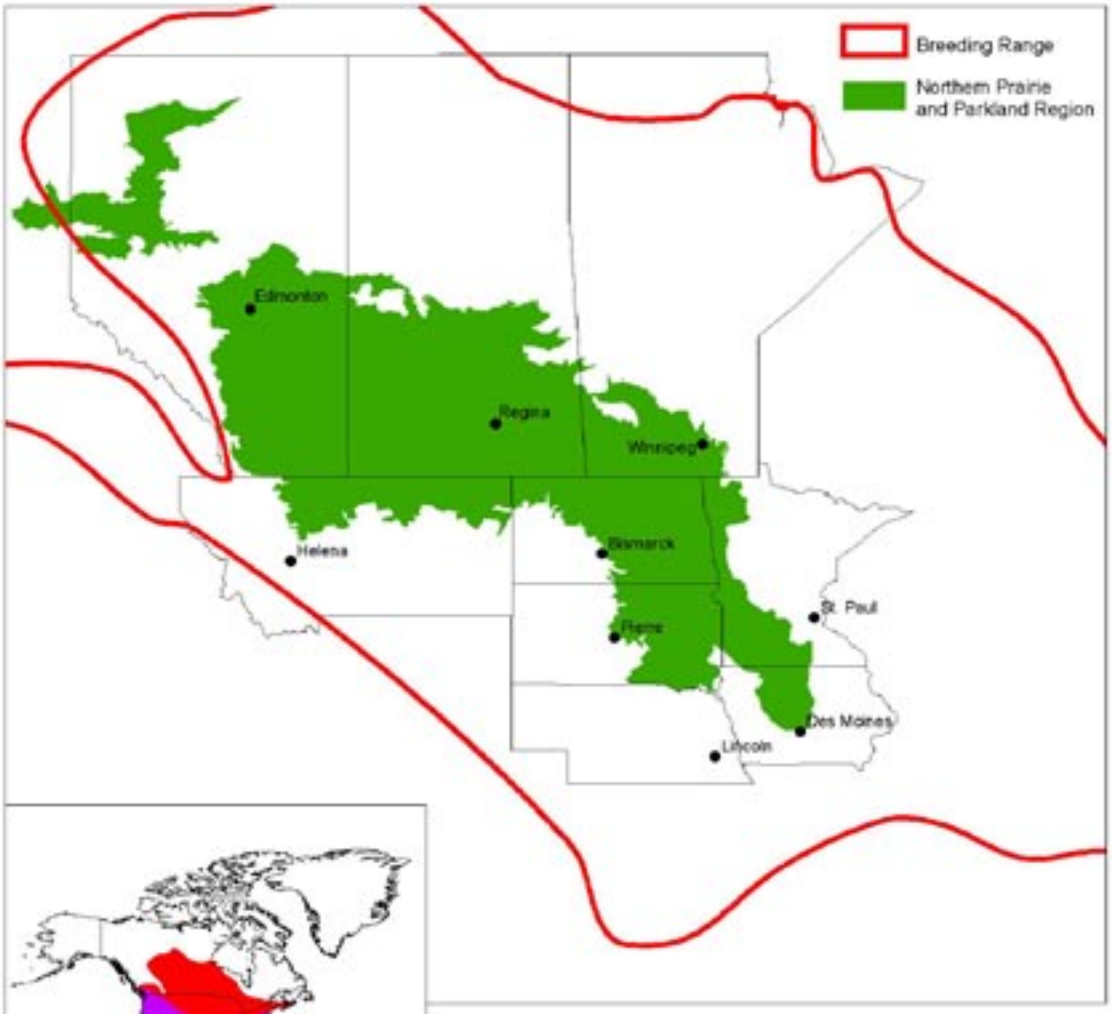
- Determine accuracy of Breeding Bird Survey and May Waterfowl Breeding Survey data.

***Primary regional contacts**:* Gary Nuechterlein, North Dakota State University.

Reference:

Muller, M. J., and R. W. Storer. 1999. Pied-billed Grebe. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 410. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Pied-billed Grebe Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Birds of North America;
National Geographic field guide;
Sibley Guide

Note: South American range not shown

Horned Grebe – *Podiceps auritus*
Grebe Cornu – Zambullidor Cornudo

***Status Summary**:*

Regional conservation vulnerability: **High Concern**

Population trend	[4]
Relative abundance	[4]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[2]
Area importance of BCR11	[3]

Continental and BCR11 populations	200,000 - 400,000;	Unknown
Population trend in BCR11	[-2.44%/yr, p = 0.28]	
Population trend in North America	[-3.2%/yr, p = 0.07]	
Abundance status in BCR11	Common	
BCR11 % of continental population	10-24%	

Occurrence in NP&PR: Horned Grebes breed in Alberta, Saskatchewan, and Manitoba; northeastern and northwestern Montana, north and east North Dakota, northeast South Dakota, and northwestern Minnesota. Casual in winter throughout NP&PR. Nests solitarily or in loose aggregations; occasionally in small colonies. Occurrence within range depends on presence of suitable wetlands. Breeding range has shown a slow, long-term contraction northwestward.

Habitat requirements: Breeds in small (minimum about 0.05 ha) to moderate-sized (1-10 ha), fairly shallow freshwater ponds and marshes with beds of emergent vegetation (especially sedges, rushes and cattails), and substantial areas of open water. Slightly brackish/alkaline water also suitable. Artificial ponds and borrow pits are used. Generally forages in shallow to moderately deep waters with shallow freshwater sites selected during the summer. Spring and fall migration regularly occurs along coasts and inland on moderate or mainly large-sized (1,000 + ha.) bodies of water, including rivers. Birds winter on moderate to mainly large-sized bodies of fresh and more commonly salt water, usually inshore.

Global distribution: Holarctic. Horned Grebes are widespread, uncommon breeders in regions of Eurasia, from extreme NW Europe, eastward to Siberia, south to Russia, and south to Korea. In Europe birds winter along coasts south to the Mediterranean with main concentrations in the North Atlantic in Scotland, along Norwegian coasts and the Baltic and Caspian Seas. In North America, breeds in Alaska, northern Canada south to British Columbia, Saskatchewan, Manitoba, Montana, Dakotas and northwest Minnesota. A disjunct population occurs in Quebec. In North America, birds winter on the Pacific coast south to California, and on the Atlantic and Gulf coasts to Florida and Texas respectively. Winters occasionally inland from the Great Lakes south.

Issues in NP&PR:

- Current population estimates and distribution are unknown, but Horned Grebe appears to be declining throughout the NP&PR and elsewhere.
- Wetland loss/degradation may limit nesting habitat and food resources.

Existing action:

- Listed as threatened in Minnesota.
- This species has been monitored on ground segments of the annual May Waterfowl Breeding Surveys in the Canadian prairies since 2000.

Action needed:

- More accurately estimate population distribution, size, and trend.
- Identify and target high priority habitats and landscapes for conservation action.

- Identify and protect key colonies and surrounding wetlands.
- Prevent encroachment of woody vegetation around wetlands.
- Limit residential development around and recreational use of wetlands.
- Maintain wetland complexes and stable water levels.

Research needed:

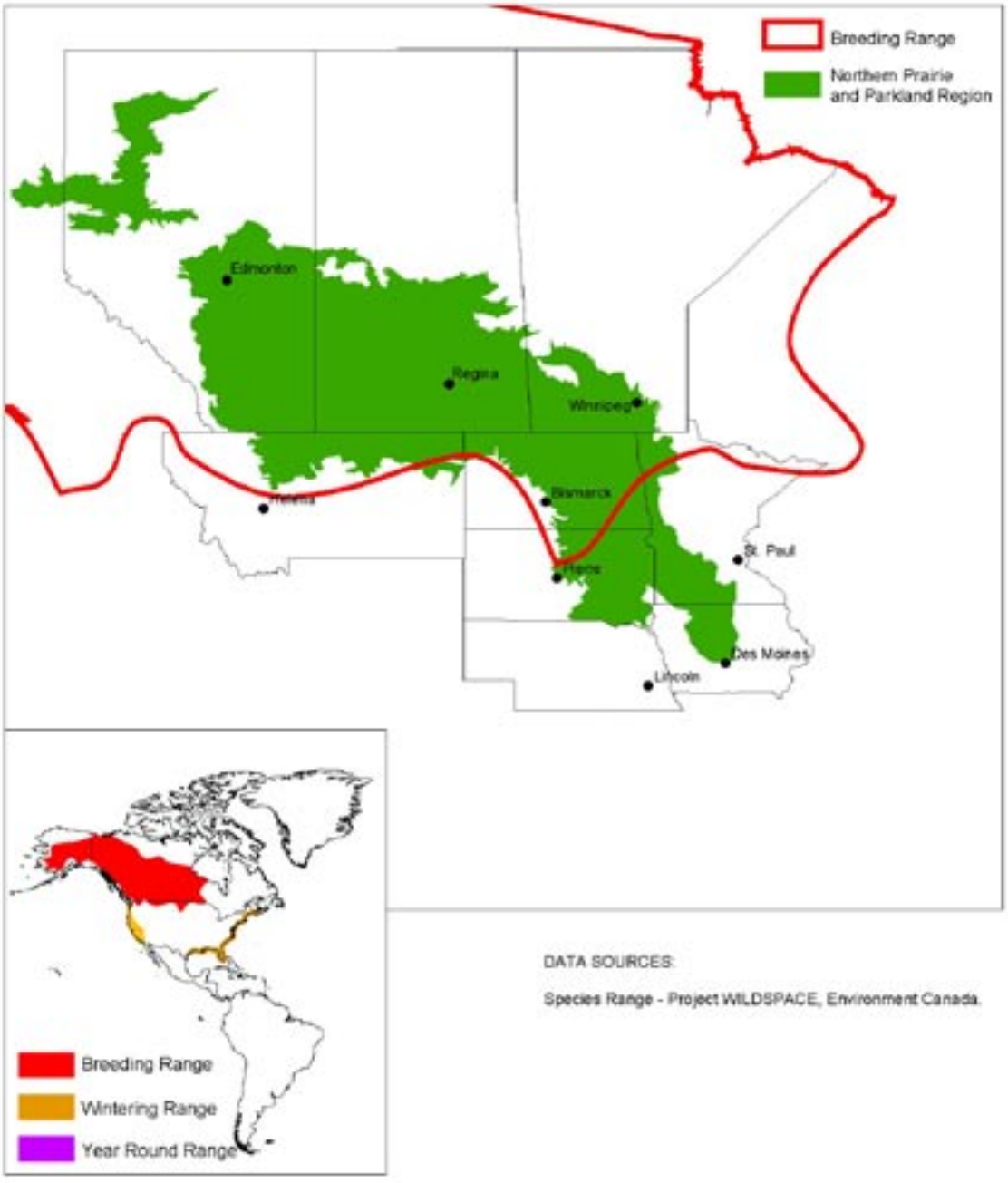
- Assess accuracy of Breeding Bird Survey and May Waterfowl Breeding Survey data.

Primary regional contacts*:* Gary Nuechterlein, North Dakota State University.

Reference:

S. J. Stedman. 2000. Horned Grebe. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 505. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Horned Grebe Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Red-necked Grebe - *Podiceps grisegena*
Grèbe jougris - Zambullidor Cuello Rojo

***Status Summary*:**

Regional conservation vulnerability: **Low Risk**

Population trend	[2]
Relative abundance	[4]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[2]
Area importance of BCR11	[2]

Continental and BCR11 populations:	110,000 - 140,000;	Unknown
Population trend in BCR11:	[4.36%/yr., p = 0.28]	
Population trend in North America:	[0.1%/yr., p = 0.92]	
Abundance status in BCR11:	Common (north) to rare (south)	
BCR11 % of continental population:	< 10 %	

***Occurrence in NP&PR*:** A common breeding species in the parkland portion of central Alberta, in central and eastern Saskatchewan, and southwestern Manitoba. Isolated populations in north-central and eastern North Dakota (especially the Turtle Mountains), northeast South Dakota, and central Minnesota. Occurs as a regular migrant in both spring and fall on most large lakes. A possible migratory divide exists in Manitoba, with birds west of this point wintering on the Pacific coast, and eastern birds wintering primarily on the Atlantic coast.

***Habitat requirements*:** Breeds mainly on shallow, freshwater lakes, or protected marsh areas and secluded bays of larger lakes, with some emergent vegetation. Prefers wetlands dominated by open-water (~60-80%) with some emergent vegetation, such as bulrush and pond lily (~20-40%). Also occurs in bogs, sloughs, quiet river channels, alkaline lakes, large irrigation ditches, and borrow pits. Rarely occupies water bodies of <2 ha in the southern portion of its range.

***Global distribution*:** Breeds from 41º to 70º N in North America and from 36º to 69º N in Europe and Asia. Breeds north to near tree limit in Alaska, Yukon Territory, Northwest Territory, and east to southwestern Quebec; south to Oregon, Idaho, Wyoming, Montana, South Dakota, Minnesota, Wisconsin, and southern Ontario. Occurrence is sporadic throughout range and is limited to suitable water bodies. In Old World, occurs as two distinct populations; one in eastern Asia and the other in eastern Europe and western Asia. Casual in Hawaiian Islands, Greenland, Iceland, and western Europe. In North America, winters coastally from Alaska to southern California, and Nova Scotia to central Florida, casually along Gulf coast.

***Issues in NP&PR*:**

- Potential for nest desertion or destruction through wave action caused by watercraft.
- Removal of forests surrounding lakes and removal of shoreline emergent vegetation both reduce habitat quality.
- Pesticides may lower reproductive success.

***Existing action*:**

- This species has been monitored on ground segments of the annual May Waterfowl Breeding Surveys in the Canadian prairies since 2000.
- Detected in small numbers on the Breeding Bird Survey.

***Action needed*:**

- Identify and protect key colonies and surrounding wetlands.
- Educate public to reduce impacts of shoreline developments and recreational activities.

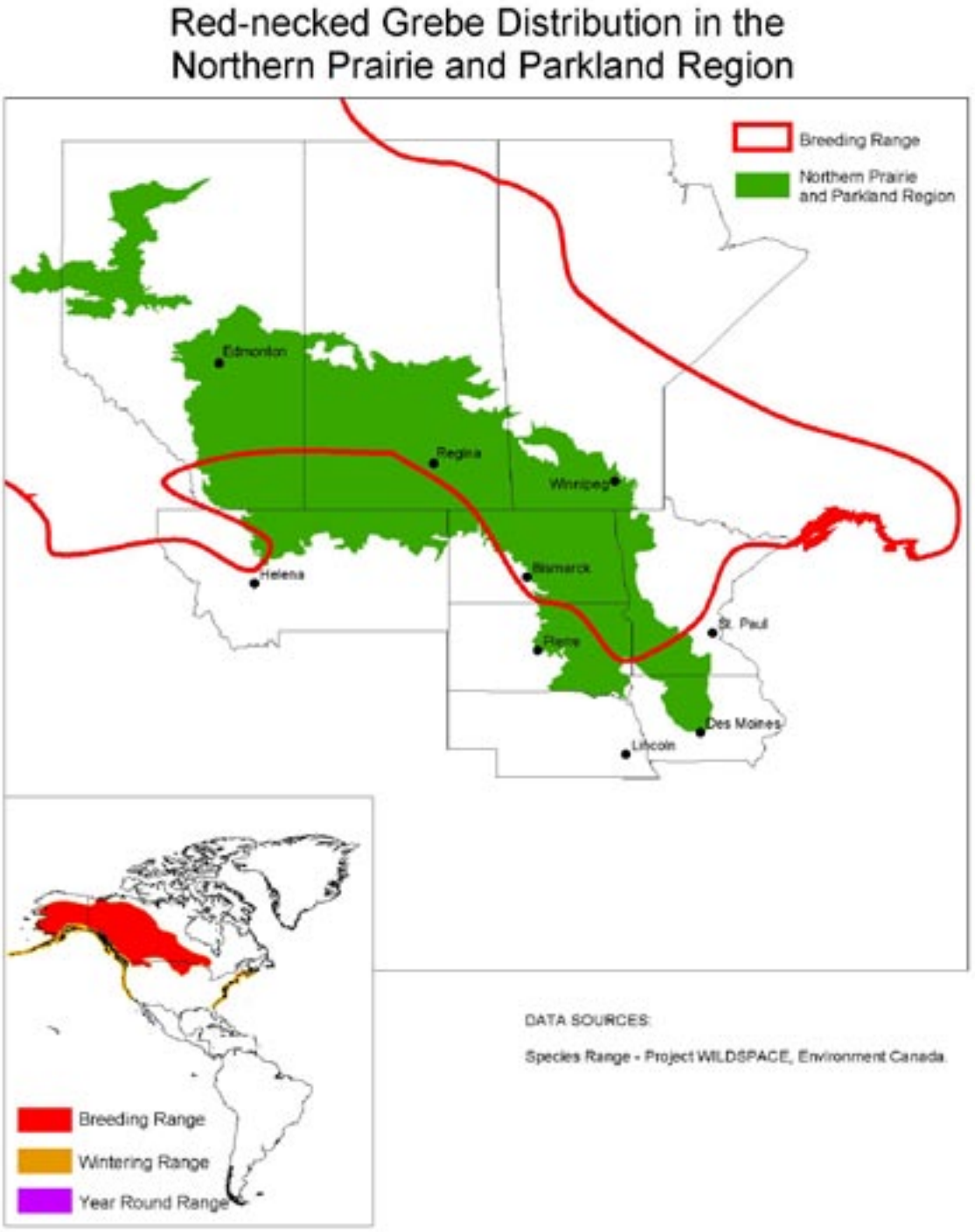
***Research Needed*:**

- Determine accuracy of Breeding Bird Survey and May Waterfowl Breeding Survey data.

***Primary regional contacts*:** Gary Nuechterlein, North Dakota State University.

Reference:

Stout, B. E., and G. L. Nuechterlein. 1999. Red-necked Grebe. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 465. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Eared Grebe – *Podiceps nigricollis*
Grèbe à cou noir – Zambullidor Orejudo

***Status Summary**:*

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **Moderate Concern**

Population trend	[3]
Relative abundance	[1]
Threats to breeding	[2]
Threats to non-breeding	[4]
Breeding distribution	[2]
Non-breeding distribution	[3]
Area importance of BCR11	[3]

Continental and BCR11 Populations	3,800,000 - 4,100,000;	~800,000
Population trend in BCR11	[12.41%/yr., p = 0.33]	
Population trend in North America	[6.9%/yr., p = 0.01]	
Abundance status in BCR11	Locally Common	
BCR11% of Continental Population	~20%	

Occurrence in NP&PR: The most abundant member of its family, the Eared Grebe is a widespread and locally abundant breeder throughout most of the NP&PR. Eared Grebe is normally a colonial breeder, with variable colony size. In Canada it breeds throughout the Prairie Pothole Region in Alberta, Saskatchewan and Manitoba. In the U.S. it breeds from the Canadian border south through Montana, east to eastern North Dakota, NW and SW Minnesota, and NW Iowa. Migration is primarily nocturnal. Eared Grebes fly from breeding to staging areas with few, if any, intervening stops. Fall migration begins immediately after the breeding season, when most individuals undergo a molt migration to hyper-saline lakes in the Great Basin of western U.S.

Habitat requirements: Frequents shallow lakes and ponds with emergent vegetation and high macro-invertebrate numbers. Use of specific nesting wetlands is unpredictable, partially due to seasonal and annual changes in water levels. During migration prefers saline habitats. Very social, colonies can number into the low thousands. Colonies are usually in marshy areas away from trees. Nests consist of a floating platform anchored to vegetation with aquatic plant material heaped on top. Sometimes nests within Franklin's Gull colonies, building nests attached to the gulls' nests.

Global distribution: Can be found in southwest Canada, western USA, south Africa, British Isles, Scandinavia, central Russia, eastern Siberia and south to the Mediterranean region. Winters from southern British Columbia to Guatemala (possibly El Salvador) on the Pacific coast, inland north to central California, northern Nevada, northern Utah, northern New Mexico, and central Texas. Highest concentrations in winter occur at Salton Sea, California.

Issues in NP&PR:

- Population status not well known due to inconsistent surveys and varying survey techniques.
- Habitat loss and fragmentation in littoral zone due to lakefront property development.
- Human disturbance, especially from powerboats.
- Water level fluctuations, especially on lakes used for recreation.
- Cattail encroachment on prairie wetlands.
- Botulism outbreaks on some lakes in the region can result in high mortality of this species.

Existing action:

- This species has been monitored on ground segments of the annual May Waterfowl Breeding Surveys in the Canadian prairies since 2000.
- Ongoing survey and study in Aspen Parkland in Alberta.

Action needed:

- Monitor existing and historic colonies to provide population estimates and understand shifts in site use over time and in relation to environmental conditions.

- Open cattail-choked wetlands to create proper interspersion of water and emergent vegetation.
- Prevention of encroachment of woody vegetation around wetlands.
- Limiting of residential development around and recreational use of wetlands.
- Maintain wetland complexes and stable water levels.
- Consider placement of towers, wires, and other structures away from wetlands used by grebes.
- Public education at the local level, targeting anglers, boaters and cottage owners.

Research needed:

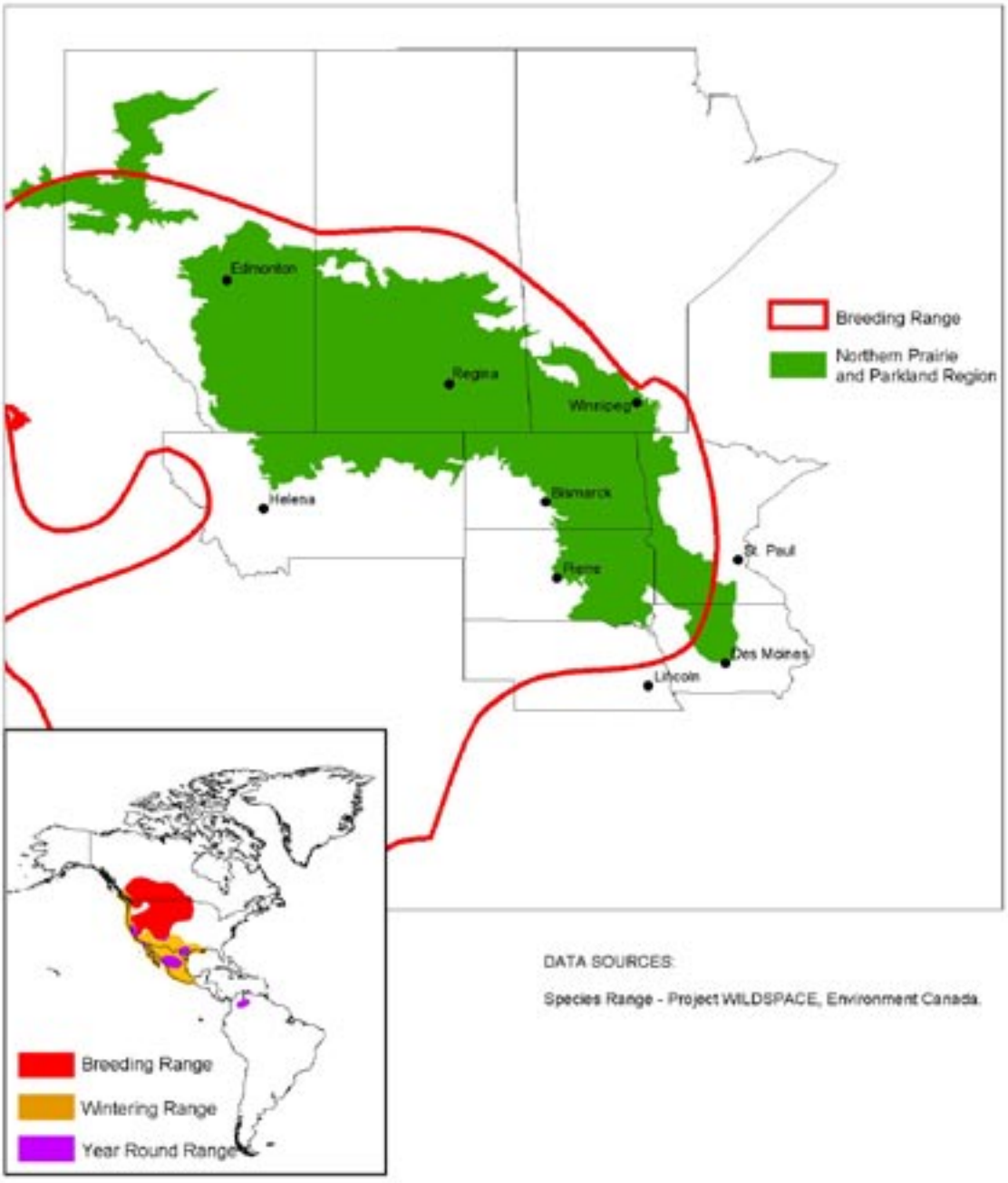
- Determine accuracy of Breeding Bird Survey and May Waterfowl Breeding Survey data.
- Determine location, annual variability of location, and consistency of use of individual sites to better understand colony dynamics.
- Determine influence of wetland basin and complex characteristics on habitat selection and site fidelity.
- Determine effect of interspecific interactions on Eared Grebes, which nest among or near many other waterbird species, as well as potential depredation of Eared Grebe nests by American Coots.
- Determine effective means of cattail control.
- Assess mortality due to botulism outbreaks.
- Determine if selenium toxicity is a problem in the northern Great Plains.

Primary regional contacts: Gary Nuechterlein, North Dakota State University; Janet Boe, Minnesota DNR; Stephen Hanus, Alberta Fish & Wildlife Division.

Reference:

Cullen, S. A., J. R. Jehl, Jr., and G. L. Nuechterlein. 1999. Eared Grebe. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 433. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Eared Grebe Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Western Grebe - *Aechmophorus occidentalis*
Grèbe élégant- Achichilique Piquiamarillo

***Status Summary**:*

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **High Concern**

Population trend	[3]
Relative abundance	[2]
Threats to breeding	[4]
Threats to non-breeding	[4]
Breeding distribution	[3]
Non-breeding distribution	[3]
Area importance of BCR11	[2]

Continental and BCR11 populations	>110,000; ~9,200?
Population trend in BCR11	[10.48%/yr, p = 0.24]
Population trend in North America	[0.4%/yr, p = 0.40]
Abundance status in BCR11	Common
BCR11 % of continental population	< 10%

Occurrence in NP&PR: Common local breeder throughout the NP&PR where suitable habitat exists. Typically arrives on breeding grounds in region in late April to early May. Nests in colonies.

Habitat requirements: Requires medium to large lakes that are deep enough for diving and to sustain fish populations. Diet composed primarily of fish, captured through underwater pursuit. Nests are placed in extensive stands of emergent vegetation, typically bulrush, but *Phragmites* and cattail used as well.

Global distribution: Breeds in west central and southern North America, south from central British Columbia, Alberta, Saskatchewan, and southern Manitoba to Mexico. Resident populations exist in central Mexico. Winter range includes most of the pacific coast of the southern U.S. and Mexico.

Issues in NP&PR:

- Population status not well known due to inconsistent surveys and varying survey techniques.
- Habitat loss and fragmentation in littoral zone due to lakefront property development.
- Human disturbance, especially from powerboats.
- Water level fluctuations.
- Botulism outbreaks on some lakes in the region can cause high mortality.

Existing action:

- Ongoing survey and study in Aspen Parkland in Alberta.

Action needed:

- Monitor existing and historic colonies to provide population estimates and understand shifts in site use over time and in relation to environmental conditions.
- Link regional and continental monitoring programs to estimate continental populations and long-term trends.
- Protect major colonies.
- Educate public at the local level, targeting anglers, boaters and cottage owners.

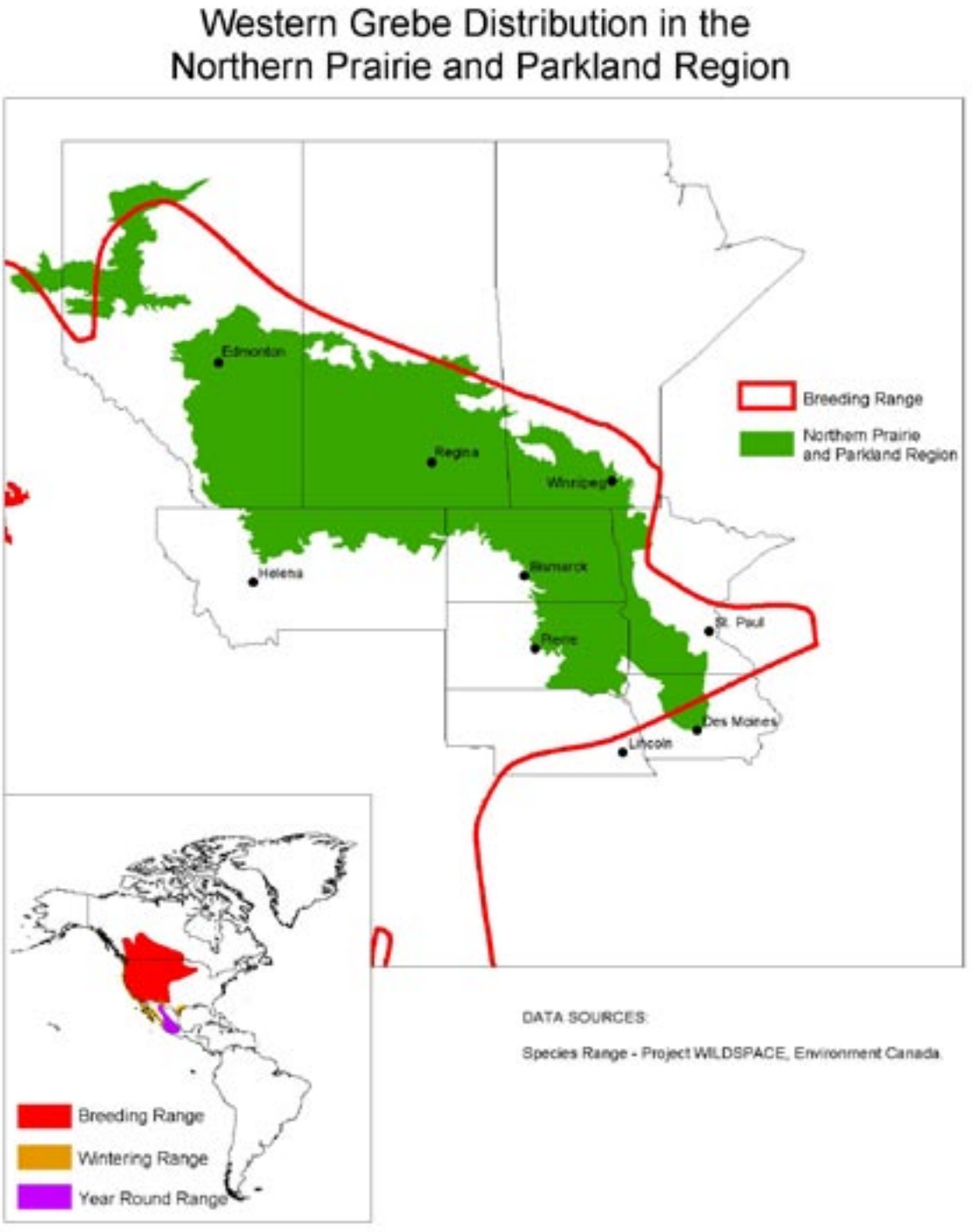
Research needed:

- Determine location, annual variability of location, and consistency of use of individual sites to better understand colony dynamics.
- Assess mortality due to botulism outbreaks.
- Determine accuracy of Breeding Bird Survey data.

Primary regional Alberta contacts: Gary Nuechterlein, North Dakota State University; Stephen Hanus, Alberta Fish & Wildlife Division.

Reference:

Storer, R. W., and G. L. Nuechterlein. 1992. Western and Clark's Grebe. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 26. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Clark's Grebe - *Aechmophorus clarkii*
Grèbe à face blanche – Achichilique Actili/ Achichilique Piquinaranja

***Status Summary**:*

Continental conservation priority: Low concern
Regional conservation vulnerability: **Low Risk**

Population trend	[3]
Relative abundance	[3]
Threats to breeding	[3]
Threats to non-breeding	[3]
Breeding distribution	[3]
Non-breeding distribution	[3]
Area importance of BCR11	[2]

Continental and BCR11 populations	~10,000?; ~588?
Population trend in BCR11	[10.48%/yr, p = 0.24]
Population trend in North America	[0.4%/yr, p = 0.40]
Abundance status in BCR11	Uncommon in southern portions of NP&PR
BCR11 % of continental population	1-9%

Occurrence in NP&PR: Rare breeder within region; typically found in the southern portion of the NP&PR. Arrives on breeding grounds in late April to early May. Nests in colonies, occasionally with Western Grebe. On Canadian prairies, almost always found in association with Western Grebes.

Habitat requirements: Requires medium to large lakes that are deep enough for diving and to sustain fish populations. Diet composed primarily of fish, captured through under water pursuit. Nests are placed in extensive stands of emergent vegetation, typically bulrush, but *Phragmites* and cattail used as well.

Global distribution: Essentially sympatric with the Western Grebe. Northern extent of range more southerly than that of Western Grebe. Breeds in west central and southern North America. Winter range includes most of the pacific coast of the southern U.S. and Mexico.

Issues in NP&PR:

- Associated with Western Grebe colonies; has similar issues.
- Human disturbance, especially from powerboats.

***Existing action**:*

- None known.

Action needed:

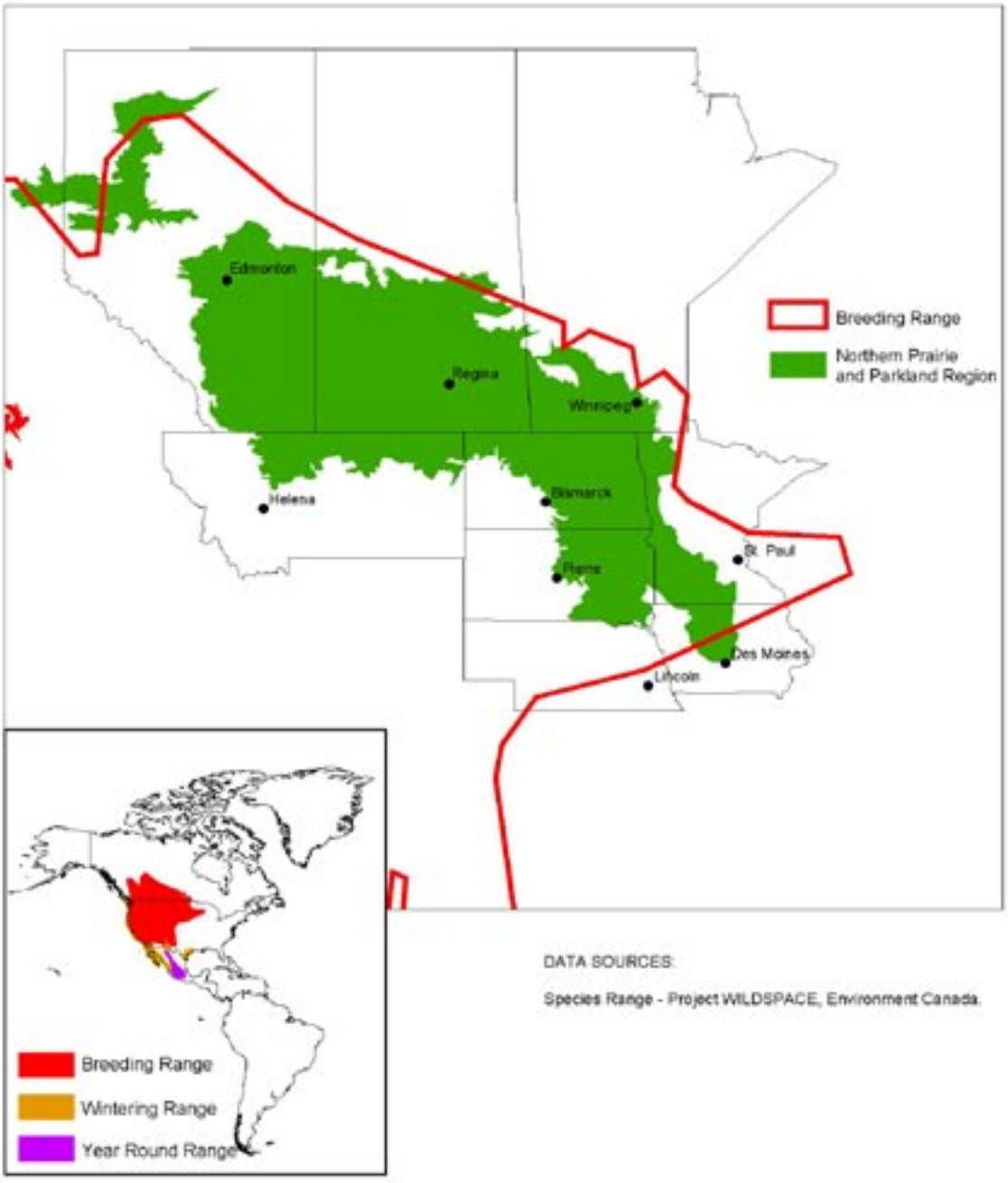
- Because of rarity of species breeding in the Region, no specific action needed other than document any increase or expansion into the region.

***Primary regional contacts**:* Gary Nuechterlein, North Dakota State University.

Reference:

Storer, R. W., and G. L. Nuechterlein. 1992. Western and Clark's Grebe. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 26. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Clark's Grebe Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

American White Pelican - *Pelecanus erythrorhynchos*
Pélican blanc d'Amérique - Pelícano Blanco Americano

***Status Summary*:**

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **Moderate Concern**

Population trend	[3]
Relative abundance	[2]
Threats to breeding	[4]
Threats to non-breeding	[3]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[4]

Continental and BCR11 populations	>109110	>32203
Population trend in BCR11	[2.36%/yr, p = 0.60]	
Population trend in North America	[1.7%/yr, p = 0.24]	
Abundance status in BCR11	Locally common	
BCR11 % of continental population	~30%	

***Occurrence in NP&PR*:** Breeds locally throughout the region. Foraging birds from nesting colonies, summering non-breeding birds, and migrants may be seen throughout the NP&PR. Occasional wintering birds have been noted in open water areas below dams. According to the most recent comprehensive survey (1979-1981) almost 30% of the world's population nested in BCR11. Since that time the pelican population has increased substantially, but most of the increase has been outside the NP&PR.

***Habitat requirements*:** Nests on barren islands in large lakes or more rarely rivers, often occurring in association with other colonial birds including Double-crested Cormorant, gulls and terns. During the breeding season forages in shallow waters of marshes, lakes and rivers. Some nesting and foraging areas are unstable due to changes in water levels, often resulting in considerable movement between sites. Winters mainly in shallow coastal waters: bays, inlets and estuaries; more rarely on inland waters.

***Global distribution*:** Nests locally in the Northern Great Plains from northern Alberta, central Manitoba and extreme southwestern Ontario to northeastern Colorado and southwestern Minnesota. Also nests very locally in the Rocky Mountains from southern Oregon and northwestern Wyoming to northern California, Nevada and Utah. Isolated breeding sites at Stum Lake in British Columbia and South Bird Island on the Gulf Coast of Texas. Has nested sporadically in Mexico. Birds nesting east of the Continental Divide winter from Florida and the Gulf Coast States south to the Yucatan; those to the west from central California to Nicaragua.

***Issues in NP&PR*:**

- Perceived competition for fish resources with sport and commercial fisheries and resultant harassment of birds in some areas.
- Periodic loss on nesting colonies of large numbers of individuals to disease / bacterial outbreaks such as Newcastle's disease, avian botulism, and West Nile Virus.
- Water management may limit breeding opportunities or increase predator access.
- High degree of concentration of breeding colonies; in Canadian portion of NP&PR, ~85% of breeders occur in five colonies.
- West Nile Virus has been implicated in substantial die-offs of young American White Pelicans at several nesting colonies in the United States.

***Existing action*:**

- Irregular surveys in some provinces and states to determine occupancy/status of some colonies, population estimates and productivity.
- Chase Lake NWR, with world's largest white pelican colony, is focal point of flagship conservation project for NAWMP.
- American White Pelican is listed as a species of special concern in Minnesota.
- Satellite telemetry project at Medicine Lake NWR indicates large home ranges and movements.

Action needed:

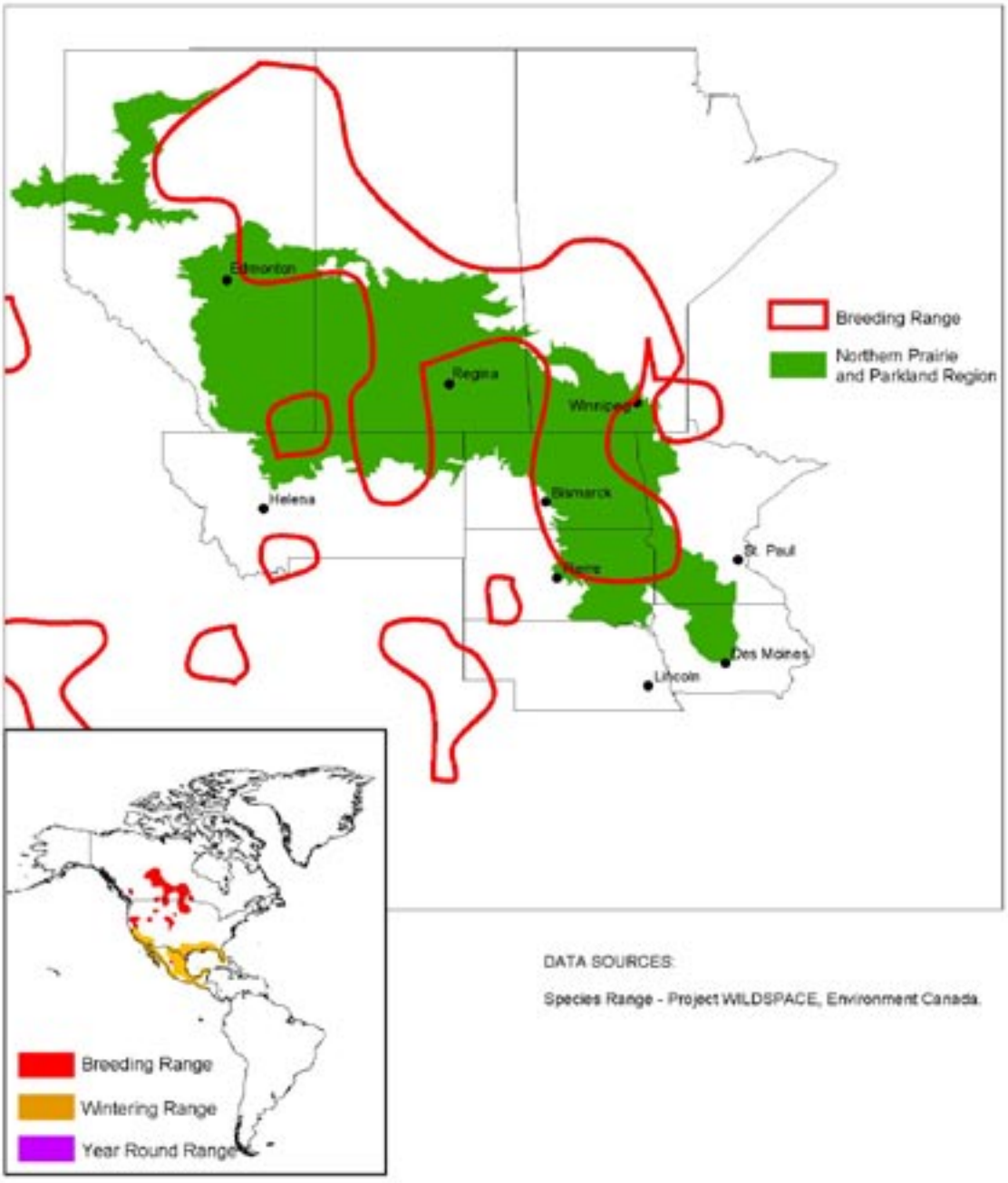
- Monitor new, existing, and historic colonies to provide population estimates and understand shifts in site use as a function of time and environmental conditions. Link to a continental monitoring scheme to estimate continental population sizes and trends over the long term.
- Monitor influence of West Nile Virus and other diseases on populations of American White Pelican and on specific colonies.

Primary regional contacts: Mick Erickson, USFWS; Gregg Knutsen, USFWS; Marsha Sovada, USGS Northern Prairie Wildlife Research Center; Keith Roney, Royal Saskatchewan Museum.

Reference:

Evans, R. M., and F. L. Knopf. 1993. American White Pelican. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 57. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

American White Pelican Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Double-crested Cormorant – *Phalacrocorax auritus*
Cormoran a aigrettes – Cormorán Bicrestado

***Status Summary**:*

Continental conservation priority: Not At Risk
Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[2]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[3]

Continental and BCR11 populations	>740,000; ~113,000
Population trend in BCR11	[27.87%/yr, p = 0.22]
Population trend in North America	[10.1%/yr, p < 0.01]
Abundance status in BCR11	Common to locally abundant
BCR11 % of continental population	~15%

Occurrence in NP&PR: Colonial breeder associated with medium to large bodies of water. Range and numbers are expanding.

Habitat requirements: Uses a variety of wetland habitats, including lakes, reservoirs, slow-moving rivers, and large wetlands. Typically forages on a variety of fish, also other aquatic animals including invertebrates and amphibians; cormorant abundance typically associated with prey levels. Prefers structure in water (e.g., dead trees, rocks, islands, sandbars) for roosting and resting. Nests on ground (typically islands) or trees, and readily uses artificial sites.

Global distribution: Breeding range restricted to interior and coastal North America. Winters in Mexico, southeastern U.S., and West Coast of U.S. and Canada. Casual from the Azores and England.

Issues in NP&PR:

- Both distribution and population are increasing.
- Increasing conflicts due to depredation (real and perceived) of game fish and hatchery fish.

Existing action:

- Irregular surveys in some provinces and states to determine occupancy/status of some colonies, population estimates and productivity.

Research needed:

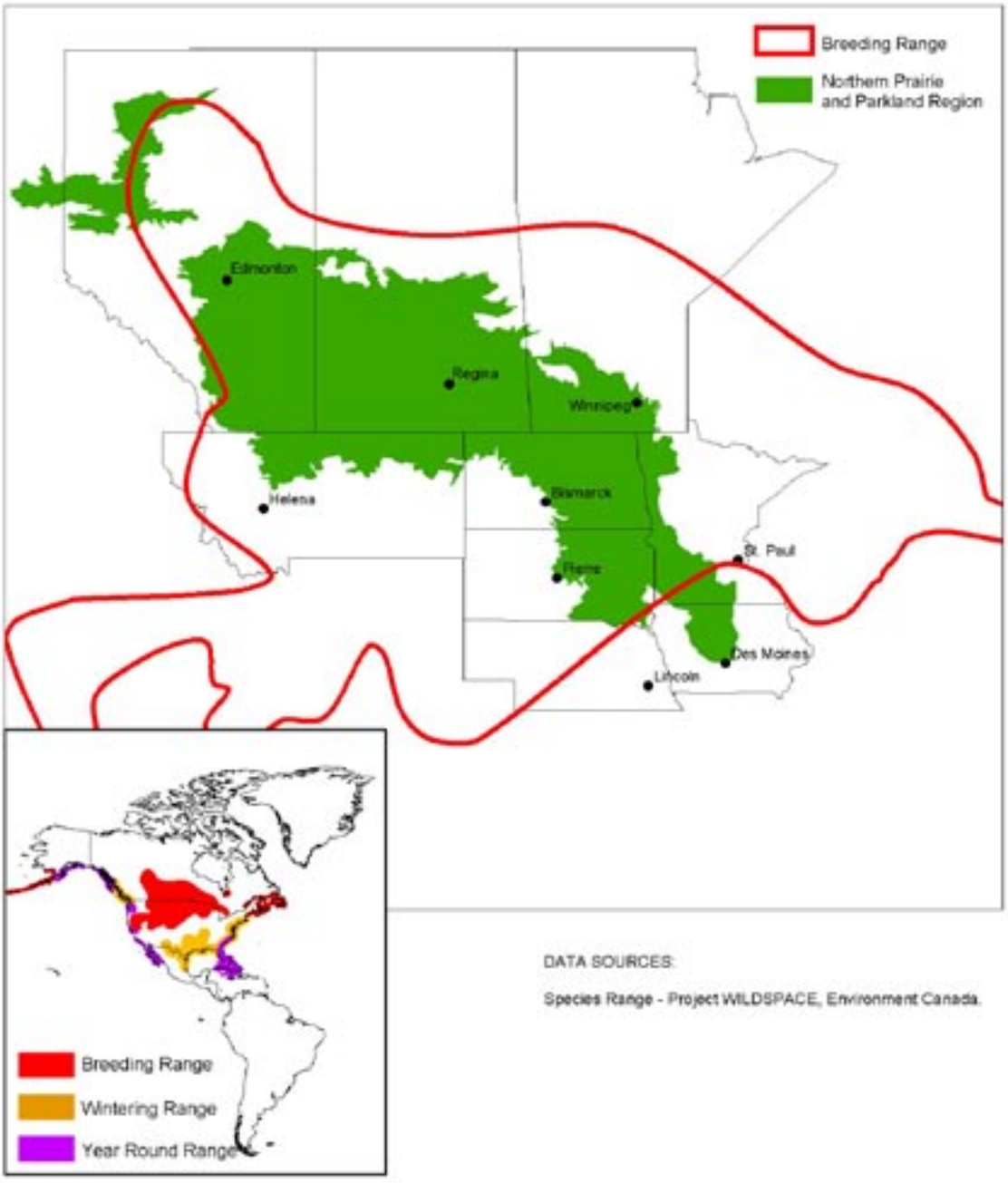
- Determine current status of colonies and population estimate.
- Determine if fisheries depredation is a real issue in the NP&PR. Determine applicability of research on fisheries interactions from other regions.
- Determine whether increasing populations are influencing colony habitat quality and/or affecting breeding success of other colonial nesting species at the same site.

***Primary regional contacts**:* Keith Roney, Royal Saskatchewan Museum.

Reference:

Hatch, J. J., and D. V. Weseloh. 1999. Double-crested Cormorant. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 441. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Double-crested Cormorant Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

American Bittern – *Botaurus lentiginosus*
Butor d'Amerique – Avetoro norteno/Avetoro americano

***Status Summary**:*

Regional conservation vulnerability: **High Concern**

Population trend	[4]
Relative abundance	[4]
Threats to breeding	[3]
Threats to non-breeding	[3]
Breeding distribution	[1]
Non-breeding distribution	[2]
Area Importance of BCR11	[5]

Continental and BCR11 populations	Unknown.
Population trend in BCR11	[-2.15%/yr, p = 0.28]
Population trend in North America	[-1.2%/yr, p = 0.19]
Abundance status in BCR11	Locally common.
BCR11 % of continental population	> 50%

Occurrence in NP&PR: Non-colonial, although several nests may be found close together in the territory of one male, suggesting polygamy (known to occur in the European species). Widely distributed as a breeding bird, it is most abundant in more northerly portions of the region.

Habitat requirements: More abundant in larger wetlands with tall emergent vegetation than smaller wetlands. Uses a variety of ephemeral, permanent, and human-modified wetlands. Normally forages along vegetation fringes and shorelines for insects, amphibians, crayfish, and small fish and mammals. Most nests placed among dense emergent vegetation over water 5-20 cm in depth. Occasionally nests over dry ground among dense, tall (>30 cm) herbaceous cover in grasslands.

Global distribution: Breeds across Canada south to mid-continental USA from central British Columbia, northern Alberta to Hudson Bay, central Quebec and Newfoundland, discontinuous south to Texas and Florida. In winter, occurs from New York state, Ohio Valley (rarely), northern Texas, northern Nevada, southwestern British Columbia, south to southern Mexico, and Costa Rica and Panama (rarely or formerly).

Issues in NP&PR:

- Recent significant declines in numbers in the southerly portion of the species range may be linked to declining amphibian populations.
- Drainage and degradation of wetlands and loss of upland cover due to agricultural conversion.

***Existing action**:*

- Long-term studies taking place at Agassiz National Wildlife Refuge.
- A review of the effects of management practices on this species is available from the Northern Prairie Wildlife Research Center.

Research needed:

- Develop special surveys or refine existing surveys to confirm distribution information, population estimates, and identification of key areas.
- Determine habitat relationships, including area requirements.
- Determine effect of cattail control techniques used to open up wetlands for other species.
- Determine site fidelity.

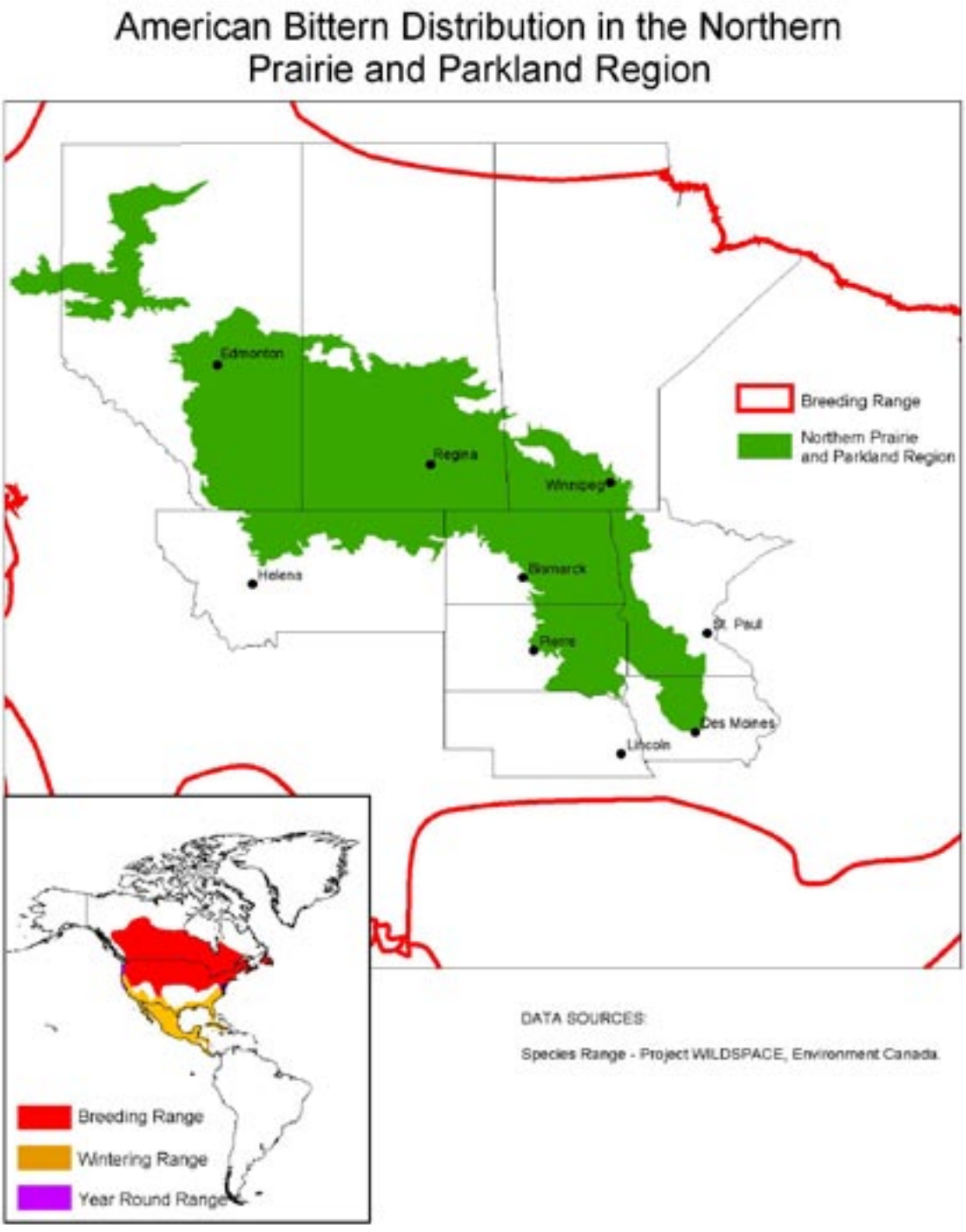
Action needed:

- Maintain wetland complexes.
- Maintain idle upland habitat around wetlands by reducing disturbances such as burning, mowing, and grazing.

Primary regional contacts: Gary Huschle, USFWS; Dave Azure, USFWS.

Reference:

Gibbs, J. P, S. Melvin, and F. A. Reid. 1992. American Bittern. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 18. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Least Bittern – *Ixobrychus exilis*
Blongios Minute – Garza Enana/Avetorito Americano

***Status Summary**:*

Regional conservation vulnerability: **Moderate Concern**

Population trend	[3]
Relative abundance	[4]
Threats to breeding	[3]
Threats to non-breeding	[3]
Breeding distribution	[3]
Non-breeding distribution	[1]
Area importance of BCR11	[2]

Continental and BCR11 populations	Unknown
Population trend in BCR11	Unknown
Population trend in North America	[-1.2%/yr, p = 0.59]
Abundance status in BCR11	Uncommon to rare
BCR11 % of continental population	< 10%

Occurrence in NP&PR: Least Bitterns nest in portions of NP&PR in Iowa, Minnesota, eastern North Dakota, eastern South Dakota, and southern Manitoba. Typically nests solitarily, however, may be semi-colonial near abundant food and quality nesting habitat. Abundance is unclear due to the lack of effective monitoring techniques.

Habitat requirements: Nests in freshwater wetlands that have fairly even ratios of open water and thick-stemmed emergent vegetation (hemi-marsh). Nests are located in dense, tall stands of emergent vegetation over water and near open water. Diet consists mainly of small fish and insects but also includes amphibians and small mammals. Strong association with cattails, but this may represent widespread distribution of cattails rather than selection.

Global distribution: Primarily restricted to North America, with extralimital records from Colombia, the Azores, and Iceland. In North America, breeding range extends from southeastern Canada to Mexico and Costa Rica. This range includes all of the eastern U.S., west to the central Great Plains, except for the Appalachian corridor. Least Bitterns winter from Florida, coastal Texas, and Baja California south to the Greater Antilles and most of South America. There is a western population that breeds as far north as central California.

Issues in NP&PR:

- None known.

Existing action:

- Listed as threatened species in Manitoba (COSEWIC).

Research needed:

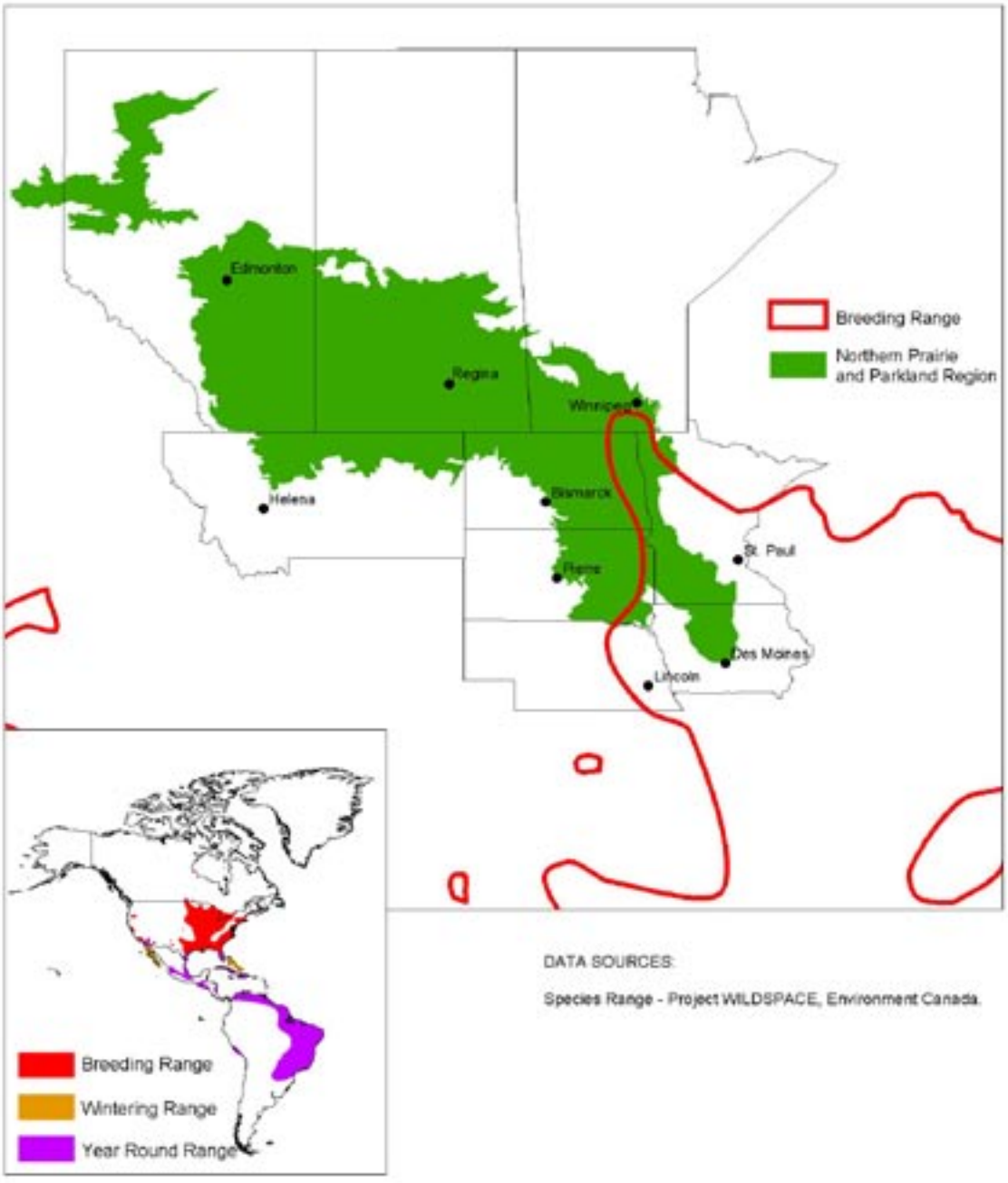
- Develop effective monitoring techniques to better determine abundance and distribution.

***Primary regional contacts**:* Gary Huschle, USFWS.

Reference:

Gibbs, J. P., F. A. Reid, and S. Melvin. 1992. Least Bittern. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 17. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Least Bittern Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Great Blue Heron - *Ardea herodias*
Grand Heron - Garzón Cenizo

***Status Summary**:*

Continental conservation priority: Not At Risk
Regional conservation vulnerability: **Moderate Concern**

Population trend	[4]
Relative abundance	[2]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[2]
Non-breeding distribution	[3]
Area importance of BCR11	[2]

Continental and BCR11 populations	>83,000; ~4,000?
Population trend in BCR11	[-1.44%/yr, p = 0.75]
Population trend in North America	[2.4%/yr, p < 0.01]
Abundance status in BCR11	Common
BCR11 % of continental population	~5%?

Occurrence in NP&PR: Breeds throughout the NP&PR where suitable habitat exists. Most nesting occurrences are in colonies, but individual nesting does occur. Considered a fairly common summer species in prairie Canada. Typically arrives on breeding grounds within the region in late March to early April.

Habitat requirements: Feeds primarily in slow-moving or calm shallow waters, including lake margins, streams, rivers, ponds, sloughs, ditches and marshes. Feeds primarily on fish, but invertebrates and other vertebrates consumed as well. Nest primarily in trees up to 30 m. Nest constructed of sticks and twigs, cup lined with grass and moss.

Global distribution: This western hemispheric species breeds from southeast Alaska south along the pacific coast to Guatemala, east of the Rockies, and south of the Precambrian Shield to Nova Scotia, and south to Cuba. Winter range is generally south of Canada and extends to Jamaica and northern South America.

Issues in NP&PR:

- Suspected negative trend in the regional population warrants moderate concern and is counter to continental “not at risk” status of species.
- Increasing conflicts due to depredation (real and perceived) of hatchery fish.
- Wetland loss/degradation may reduce near-shore feeding habitat and limit food resources.

Existing action:

- Provision of artificial nesting sites at a few locations.
- Infrequent and irregular surveys of some colonies as part of general surveys of colonial nesting birds.

Action needed:

- Determine population size and distribution through region-wide surveys of historic colony sites and potential habitat.
- Monitor existing and historic colonies to provide population estimates and understand shifts in site use over time and in relation to environmental conditions.

Research needed:

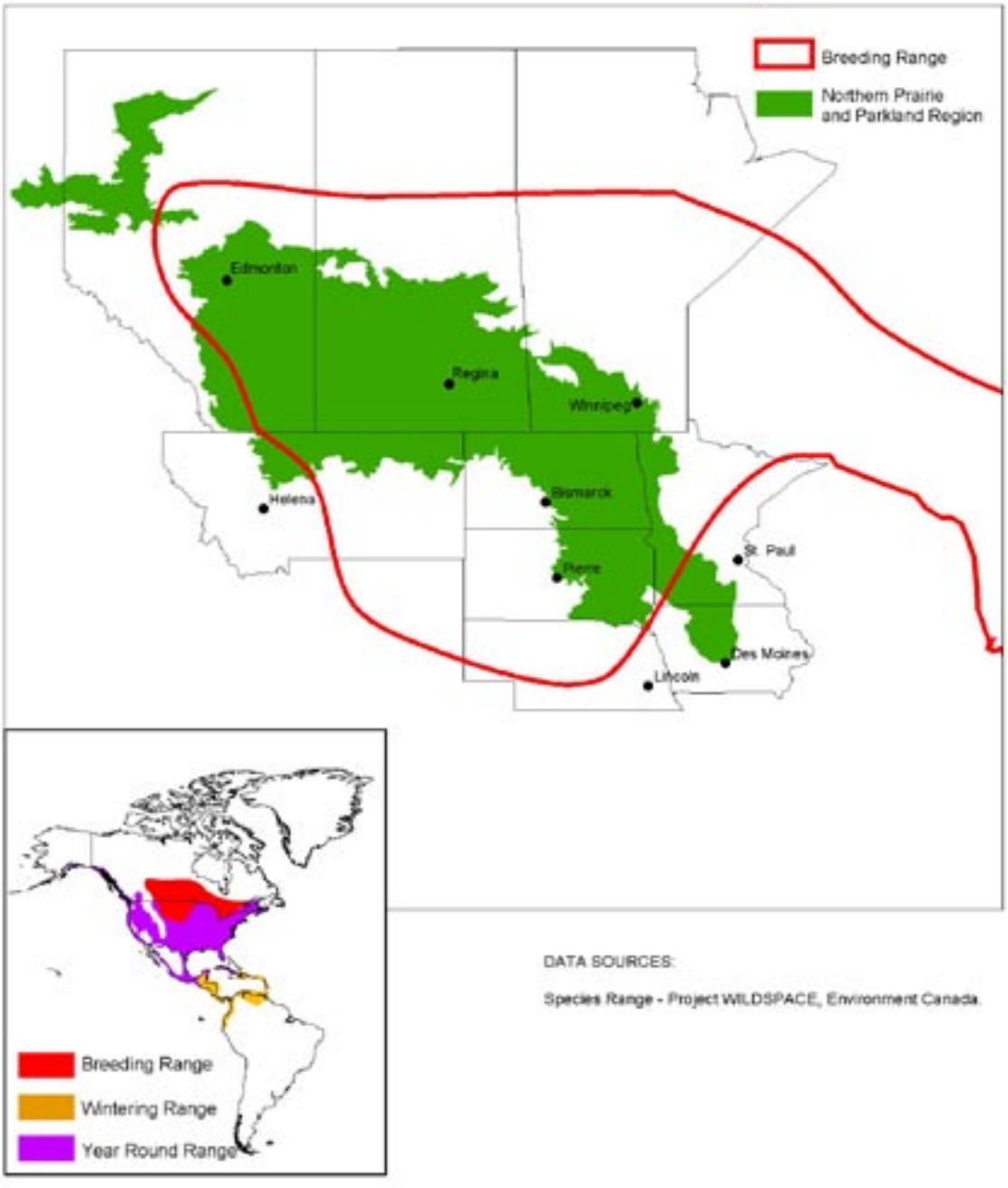
- Investigate causes of possible decline, including habitat loss and competition with Double-Crested Cormorants.

***Primary regional contacts**:* Katie Haws, Minnesota DNR; Al Smith, CWS; Mark Heckbert, Alberta Fish & Wildlife Division.

Reference:

Butler, R. W. 1992. Great Blue Heron. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 25. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Great Blue Heron Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada

Great Egret – *Ardea alba*
Grande Aigrette – Garza Grande

***Status Summary**:*

Continental conservation priority: Not At Risk
Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[2]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[?]
Non-breeding distribution	[?]
Area importance of BCR11	[1]

Continental and BCR11 populations	Unknown; ~1,000?
Population trend in BCR11	[26.12%/yr, p = 0.0004]
Population trend in North America	[2.2%/yr, p = 0.02]
Abundance status in BCR11	Uncommon
BCR11 % of continental population	< 1%

Occurrence in NP&PR: Colonial breeder found primarily in southeastern portion of the NP&PR, but has been recorded breeding in Manitoba and Saskatchewan. Casual in summer and winter throughout the region.

Habitat requirements: Inhabits streams, ponds, lakes, wooded swamps, and mudflats. Typically nests in mixed colonies in tall trees adjacent to wetlands. Feeds primarily on fish, frogs, and aquatic invertebrates found in wetlands, as well as occasional voles, mice, and snakes. Requires unpolluted wetlands and nest sites free from human disturbance.

Global distribution: Globally distributed; associated with wetlands and riparian areas on 5 continents. North American birds winter from northern North Carolina, inland in southern United States, and California, south throughout breeding range to southern South America.

Issues in NP&PR:

- Presently, habitat loss and environmental contaminants (e.g., mercury, organochlorines) are primary threats.
- Great Egrets are viewed as a threat to aquaculture and are harassed.
- Human disturbance at colonies can lead to nest abandonment.

Existing action:

- Some nesting colonies are monitored sporadically.

Action needed:

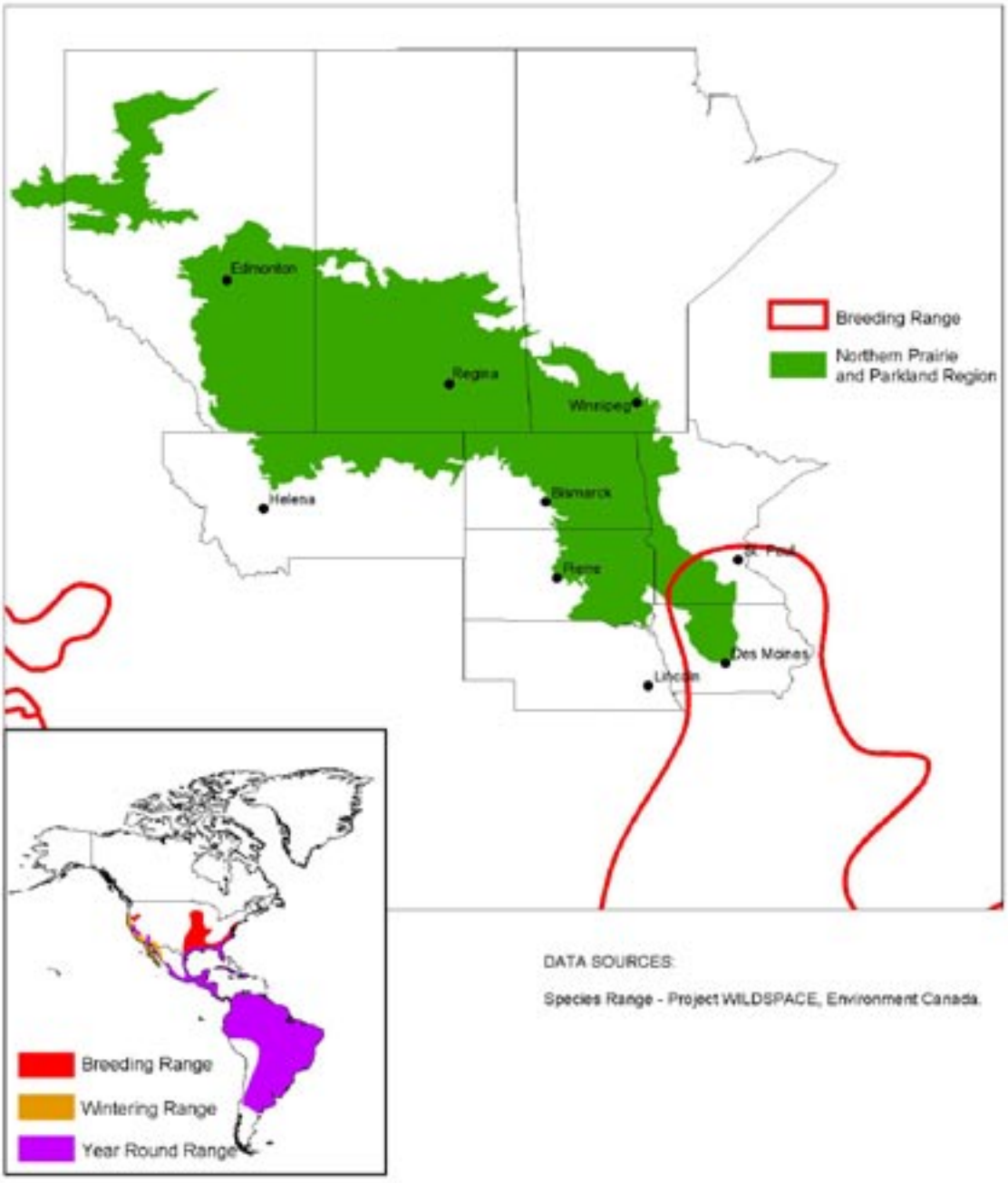
- Protect bottomland/riparian forests and associated wetlands.
- Determine if fisheries depredation is a real issue in the NP&PR.

***Primary regional contacts**:* Lisa Gelvin/Innvaer, Minnesota DNR; Katie Haws, Minnesota DNR.

Reference:

McCrimmon, D. A., J. C. Ogden, and G. T. Bancroft. 2001. Great Egret. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 570. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Great Egret Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Snowy Egret - *Egretta thula*
Aigrette neigeuse - Garceta pie-dorado, Garza Chusmita/Garza Nivea

***Status Summary**:*

Continental conservation priority: High concern
Regional conservation vulnerability: **Low Risk**

Population trend	[4]
Relative abundance	[3]
Threats to breeding	[4]
Threats to non-breeding	[3]
Breeding distribution	[3]
Non-breeding distribution	[4]
Area importance of BCR11	[1]

Continental and BCR11 populations	>40,000;	Unknown
Population trend in BCR11	Unknown	
Population trend in North America	[3.8%/yr, p = 0.0001]	
Abundance status in BCR11	Rare	
BCR11 % of continental population	< 1%	

Occurrence in NP&PR: Not an abundant breeder in NP&PR. Sporadic nesting records exist throughout the region, with probably the most well documented localized breeding population occurring in the eastern South Dakota counties of Brown, Charles Mix, Day, and Kingsbury. Within the NP&PR, Snowy Egrets typically nest small in colonies, often in mixed company with other herons. Occurrences of Snowy Egrets in the region are most commonly attributed to post-breeding dispersal movements (spring, summer, early fall) in which many individuals move to areas outside of their typical breeding range.

Habitat requirements: Breeds in a wide variety of relatively isolated fresh and saltwater habitats, ranging from marshes, lake edges, shallow coastal bays, to river bottomlands. In eastern South Dakota, the principal breeding habitat consists of stands of trees surrounding large reservoirs. Nest sites may include trees (e.g., cedar, willows, and mangrove), prickly pear cactus on dry Texas islands, and bulrush, *Phragmites* spp., and cattail in emergent wetland areas. Preferred foraging habitats include flooded rice fields, beaches, shallow reef areas, and wet grassy meadows.

Global distribution: In addition to a widespread distribution throughout the United States, small numbers summer in Nova Scotia, Canada. The Snowy Egret also breeds and winters throughout portions of Mexico, Central America, South America, and the West Indies. Vagrants have been reported on the Hawaiian Islands, American Samoa, Iceland, and the African coast.

Issues in NP&PR:

- Unknown population estimates and trend in the region.

***Existing action**:*

- None known.

Action needed:

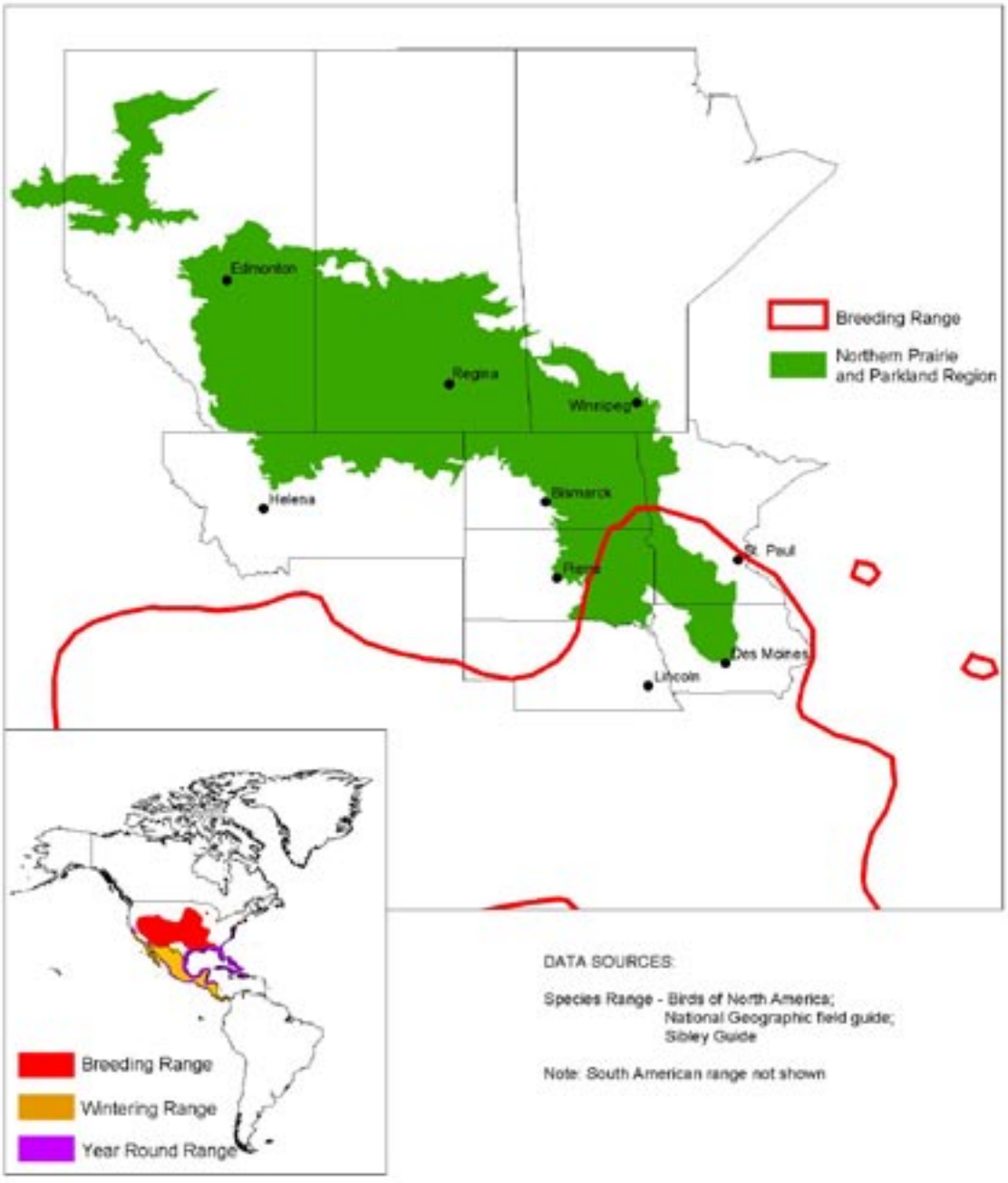
- More accurately estimate population distribution, size, and trend.

***Primary regional contacts**:* None known.

Reference:

Parsons, K. C., and T. L. Master. 2000. Snowy Egret. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 489. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Snowy Egret Distribution in the Northern Prairie and Parkland Region



Cattle Egret – *Bubulcus ibis*
Heron garde-boeufs – Garza Ganadera

***Status Summary**:*

Continental conservation priority: Not At Risk
Regional conservation vulnerability: **Low Risk**

Population trend	[2]
Relative abundance	[2]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[3]
Non-breeding distribution	[3]
Area importance of BCR11	[1]

Continental and BCR11 populations	> 1,160,000; Unknown
Population trend in BCR11	[42.84%/yr, p = 0.32]
Population trend in North America	[0.9%/yr, p = 0.34]
Abundance status in BCR11	Common or locally common
BCR11 % of continental population	< 1%

Occurrence in NP&PR: A naturally dispersed egret from Africa, the species has been observed in all states and most provinces. It is a confirmed breeder in Saskatchewan and all states in the NP&PR, commonly nesting in colonies with native ardeids. In new heronries, Cattle Egret nests can commonly number into the thousands, and have become more common during high water years.

Habitat requirements: This species is perhaps the most terrestrial of all herons and is highly adaptable to new habitats and environments. For foraging, it is best described as a generalist species adapted to naturally disturbed as well as highly disturbed, converted landscapes such as pasture and farmland. The species nests in isolated upland woodlands, flooded woodlands, islands, and coastal and inland marshes in emergent vegetation.

Global distribution: Confined mostly to temperate and tropical climates, the species continues to expand worldwide. The Cattle Egret is native to Africa, southern Portugal, Spain, Asia, India to Japan, and northern Australia. It naturally dispersed to the Americas as well as other parts of Europe and has been recorded on many remote islands.

Issues in NP&PR:

- Grazing likely affects Cattle Egret distribution and ecology.

***Existing action**:*

- Naturalist and other volunteer observers documenting range expansion in NP&PR.

Action needed:

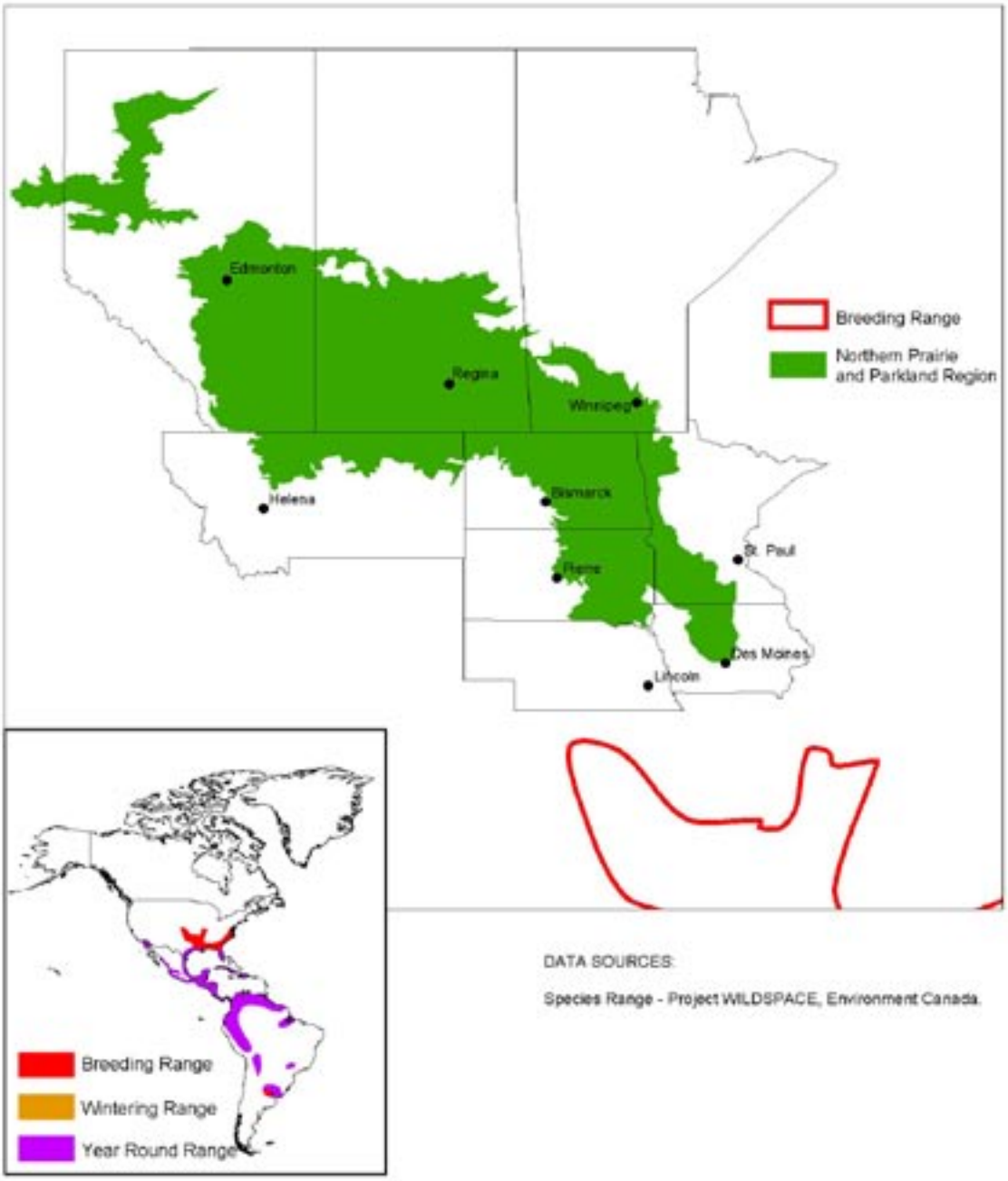
- Identify and target high priority landscapes and habitats for conservation action.
- More accurately determine population distribution, size, and trend in the NP&PR.

Primary regional contacts: None known.

Reference:

Telfair, R. C. II. 1994. Cattle Egret. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 113. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Cattle Egret Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Little Blue Heron – *Egretta caerulea*
Petit Heron Bleu – Garza azul

***Status Summary**:*

Continental conservation priority: High concern
Regional conservation vulnerability: **Low Risk**

Population trend	[4]
Relative abundance	[2]
Threats to breeding	[4]
Threats to non-breeding	[4]
Breeding distribution	[?]
Non-breeding distribution	[?]
Area importance of BCR11	[1]

Continental and BCR11 populations	Unknown; ~10?
Population trend in BCR11	Only recently confirmed nesting in BCR11
Population trend in North America	[-3.0%/yr, p = 0.04]
Abundance status in BCR11	Very rare
BCR11 % of continental population	< 1%

Occurrence in NP&PR: Colonial nester known to breed in North Dakota and South Dakota in very low numbers; casual in Saskatchewan, Montana, and Minnesota. Nesting only recently confirmed in the region. Often found in mixed breeding colonies with other waterbirds. Like many herons, post-breeding dispersal is common, and birds may be seen well north and west of their normal range.

Habitat requirements: Little Blue Herons use a variety of wetlands for feeding, including marshes, swamps, backwaters, reservoirs, ditches, mudflats, and flooded fields. They typically feed on small fish and amphibians, as well as invertebrates. Nesting is typically in shrubs and small trees in standing water or on islands, although they will nest in trees located on uplands adjacent to wetlands. Little Blue Herons are subordinate to other wading birds.

Global distribution: North American population primarily in southeastern United States, with some birds along southern California coast. Found year-round along southern U.S. coasts, Caribbean islands and northern South America. Northern birds winter primarily in Central America.

Issues in NP&PR:

- Wetland loss and degradation.

Existing action:

- Nesting has only recently been documented in the region.

Action needed:

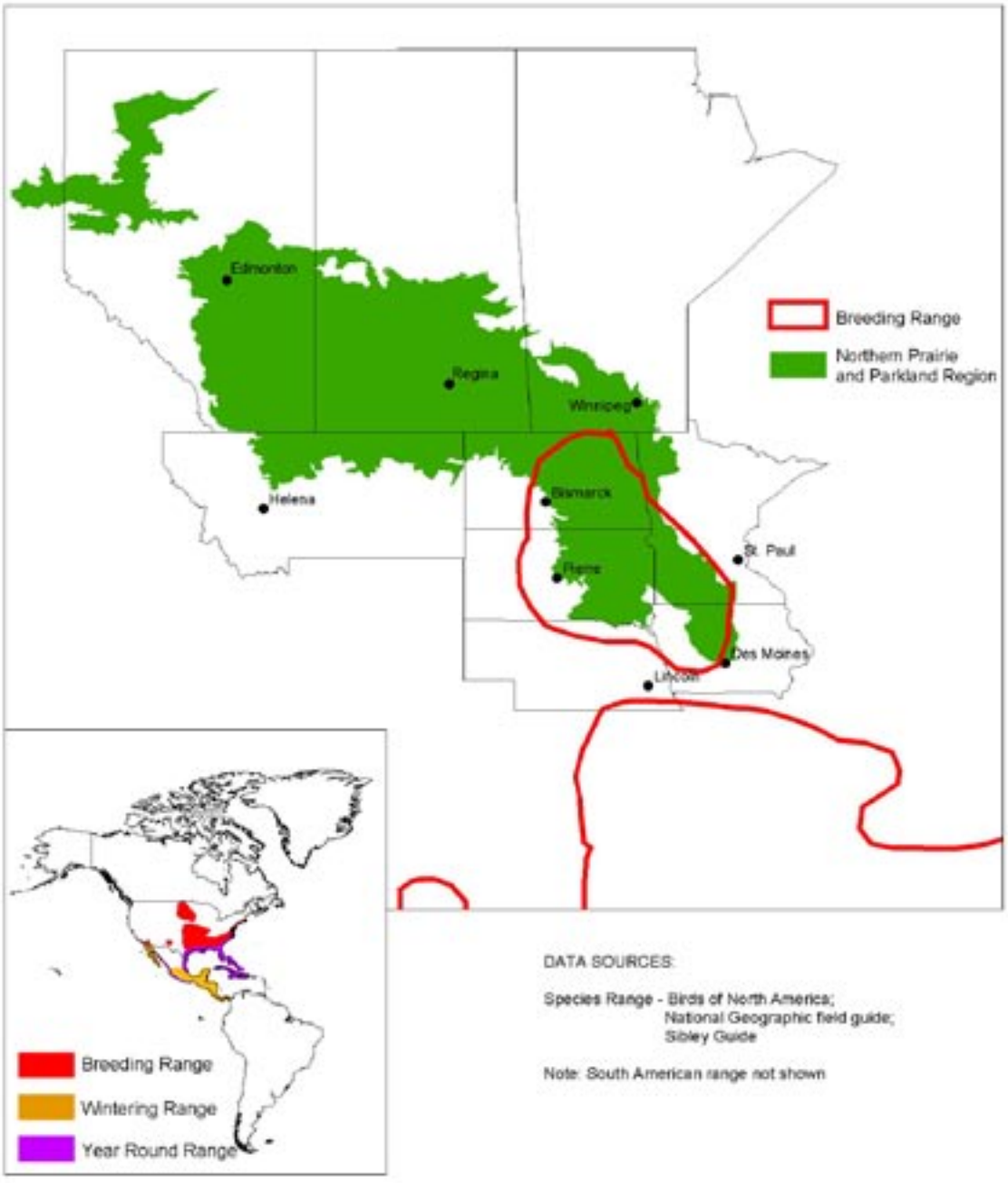
- Monitor occurrence and breeding to follow potential expansion or increase into the region.
- Little Blue Heron is an uncommon breeder in the region, and no other specific actions presently required.

***Primary regional contacts**:* Will Meeks, USFWS.

Reference:

Rodgers, J. A., Jr., and H. T. Smith. 1995. Little Blue Heron. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 145. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Little Blue Heron Distribution in the Northern Prairie and Parkland Region



Tricolored Heron – *Egretta tricolor*
Aigrette Tricolor – Garza Tricolor

***Status Summary**:*

Continental conservation priority: High concern
Regional conservation vulnerability: **Low Risk**

Population trend	[4]
Relative abundance	[3]
Threats to breeding	[4]
Threats to non-breeding	[3]
Breeding distribution	[4]
Non-breeding distribution	[4]
Area importance of BCR11	[1]

Continental and BCR11 populations	<194,000;	Unknown but small
Population trend in BCR11	Unknown	
Population trend in North America	[0.3%/yr, p = 0.83]	
Abundance status in BCR11	Rare, casual visitor	
BCR11 % of continental population	<1%	

Occurrence in NP&PR: Distribution is most commonly described as "coastal" in nature, extending northward into the interior United States as a "casual" visitor. Only in the late 1900s was the species observed in the region. Rare breeding season observations extending as far north as North and South Dakota exist, but breeding records are far less common. Nesting was confirmed in 1978 and 1986 in North and South Dakota, respectively, and a Tricolored Heron hybridized with a Snowy Egret in Brown Co., South Dakota in 1995. A colonial nester, this species is often found nesting in mixed-species groups when it is observed in the region.

Habitat requirements: On traditional coastal habitat, the species utilizes flooded mangroves and tidal marshes in saltwater areas, but will use inland freshwater wetlands. In NP&PR, often uses flooded emergent wetland plants such as cattail and bulrush. In high water events (during which most of the observations in the Region have been made), the species uses flooded woodland species such as Russian olive and willow.

Global distribution: Inhabits central Baja, California, Gulf Coast of Texas, Louisiana, Alabama; north along the Atlantic coast to New York; south along coasts of Mexico and Central America through Bahamas and Greater Antilles to Ecuador, Columbia, and Venezuela. In winter, occurs north to Baja California, southeastern Texas, along Gulf coast, Nevada, south throughout breeding range.

Issues in NP&PR:

- Recent and rare breeder; no known issues.

Existing action:

- None known.

Action needed:

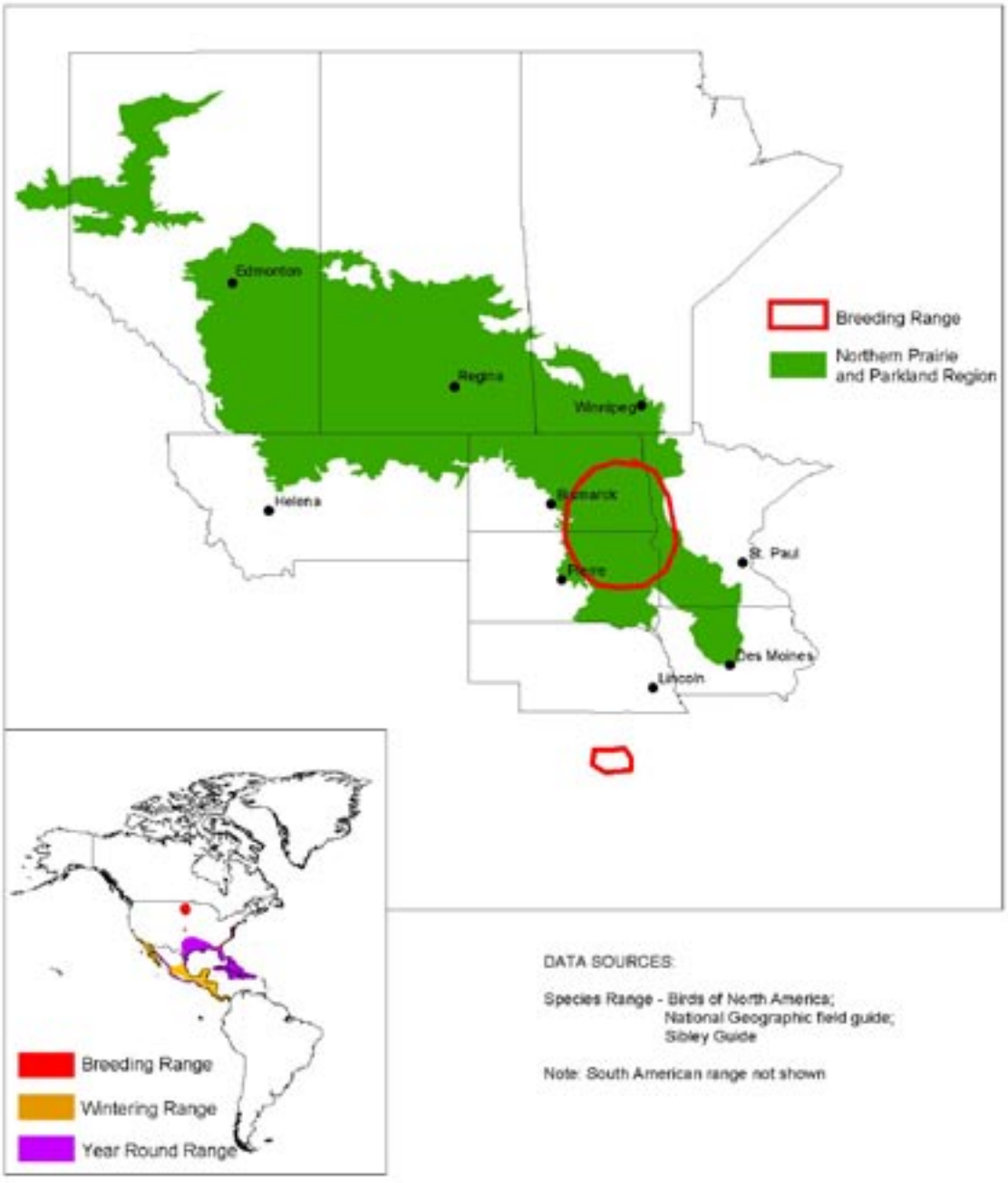
- Monitor occurrence and breeding to follow potential expansion or increase into the region.

***Primary regional contacts**:* Will Meeks, USFWS.

Reference:

Frederick, P. C. 1997. Tricolored Heron. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 306. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Tricolored Heron Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Birds of North America;
National Geographic field guide;
Sibley Guide

Note: South American range not shown

Green Heron – *Butorides virescens*
Heron Vert – Garcita Verde/Garza Verde

***Status Summary**:*

Continental conservation priority: Low concern
Regional conservation vulnerability: **Low Risk**

Population trend	[2]
Relative abundance	[3]
Threats to breeding	[2]
Threats to non-breeding	[3]
Breeding distribution	[2]
Non-breeding distribution	[4]
Area importance of BCR11	[1]

Continental and BCR11 populations	Unknown
Population trend in BCR11	[9.24%/yr, p = 0.27]
Population trend in North America	[-0.8%/yr, p = 0.0001]
Abundance status in BCR11	Uncommon
BCR11 % of continental population	< 1%

Occurrence in region: Solitary to semi-colonial breeder in North Dakota, South Dakota, Minnesota, and Iowa. Green heron is casual in Saskatchewan, Manitoba, and Montana. Like many Ardeids, Green Herons frequently disperses widely after breeding, occasionally traveling well out of its normal breeding range.

Habitat requirements: Green Heron typically inhabits and nests in shrubby or partially wooded wetlands, but will nest in upland forests near water. Green Herons feeds in swamps, riparian zones, backwaters, creeks, sloughs, and other wetlands, but typically avoids open mudflats used by many other heron species.

Global distribution: The taxonomy of the Green Heron has been debated, and during the late 1900s was combined with *B. striatus*, which is found throughout South America, the Orient, Pacific Ocean islands, Australia, India, and sub-Sahara Africa. The Green Heron is presently considered a separate species, restricted to North America, Central America, and northern South America. Winters in western Washington (rarely), coastal and south-central California, southern Arizona, southern Texas, southern Louisiana, northern Florida, south throughout breeding range to northern Colombia and northern Venezuela. Casual in Hawaii.

Issues in region:

- Recreational disturbance may be a problem.

Existing action:

- None known.

Action/research needed:

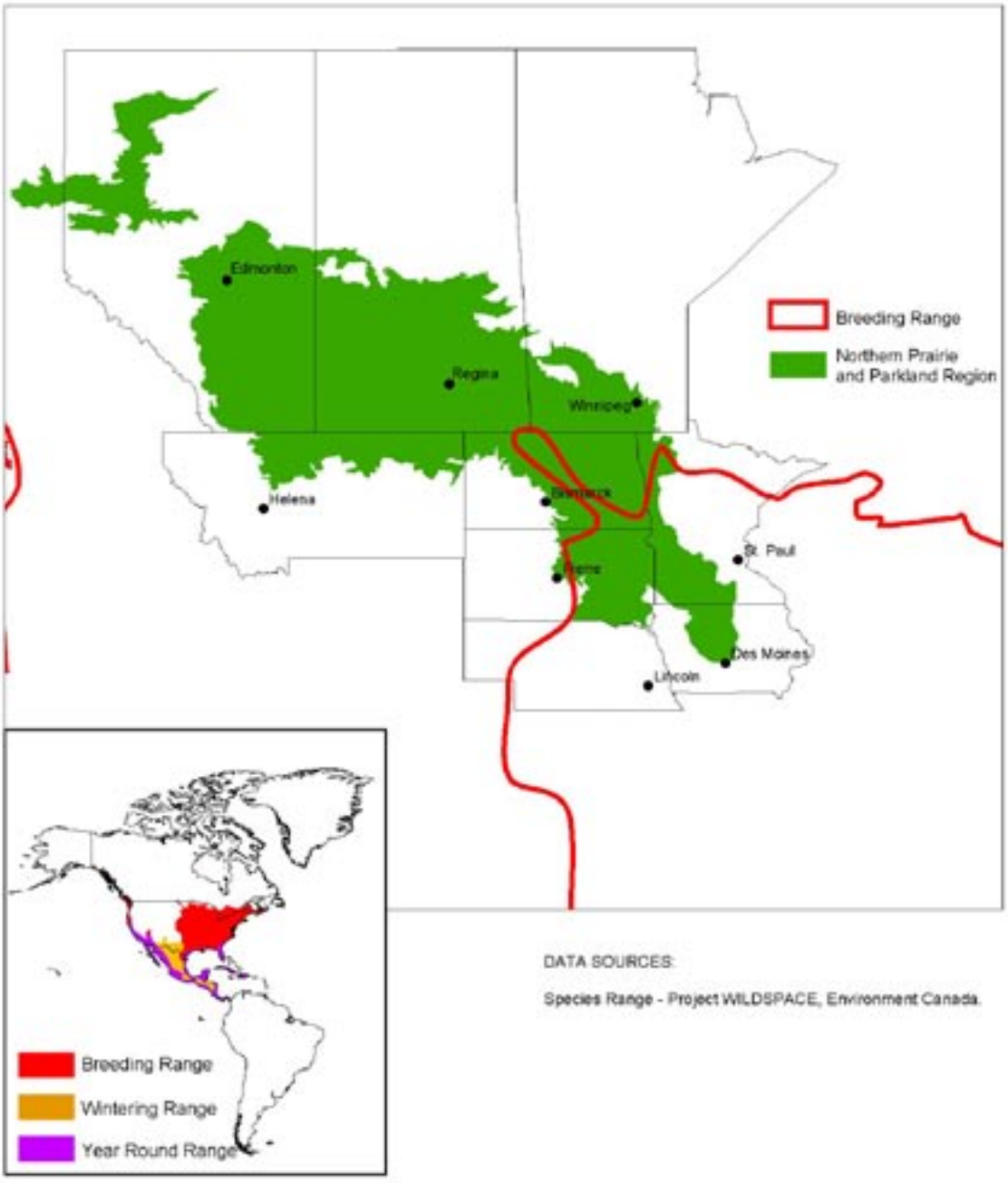
- Unknown.

***Primary regional contacts**:* Katie Haws, Minnesota DNR.

Reference:

Davis, W. E., Jr., and J. A. Kushlan. 1994. Green Heron. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 129. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Green Heron Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Black-crowned Night-heron - *Nycticorax nycticorax*
Bihoreau a couronne noire - Yaboa Real/Garza-noctura Coroninegra

***Status Summary*:**

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **Moderate Concern**

Population trend	[4]
Relative abundance	[3]
Threats to breeding	[3]
Threats to non-breeding	[3]
Breeding distribution	[2]
Non-breeding distribution	[3]
Area importance of BCR11	[2]

Continental and BCR11 populations:	>50,000; unknown
Population trend in BCR11:	[7.27%/yr., p = 0.20]
Population trend in North America:	[6.9%%yr., p = 0.02]
Abundance status in BCR11:	Uncommon and local; may be locally abundant
BCR11 % of continental population:	< 10%

***Occurrence in NP&PR*:** Locally distributed in southeast Alberta, southern Saskatchewan, and in southwest and southern Manitoba. Distributed throughout the five states in the NP&PR, with the exception of portions of southwestern North Dakota and western South Dakota. Uses wetlands during migration, but where and to what extent generally unknown. Does not over-winter in the region. Expert opinion indicates apparent decline in some areas; trend information is weak.

***Habitat requirements*:** Colonial, with most colonies being associated with large wetlands and marshes. Suitable nesting habitat is regionally variable, however use of wetlands strongly dependent on water levels. Colonies often local, and generally located on islands. Nests typically constructed in marsh vegetation or in trees. Although uncommon, has been known to nest in dry grasslands. Recently, breeding range has expanded to areas where irrigation and water impoundments provide suitable habitat.

***Global distribution*:** In North America, from Washington east to Quebec and New Brunswick, south through coastal Mexico. Occurs locally in Central America, the Caribbean, and Hawaii. Occurs south to northern Chile, Argentina, including Tierra del Fuego, and the Falkland Islands. Also occurs from Europe to Japan, and in Africa and India. Birds from the NP&PR probably over-winter in the Caribbean, southwestern Atlantic and Gulf Coast states, and Mexico. Migration is typically through Mississippi River basin.

***Issues in NP&PR*:**

- Pesticides responsible for indirect adult mortality and direct mortality of eggs and young.
- Water management an issue especially in drought years.
- Wetland loss and degradation may limit essential breeding and migratory staging habitat.

***Existing action*:**

- None known.

***Action needed*:**

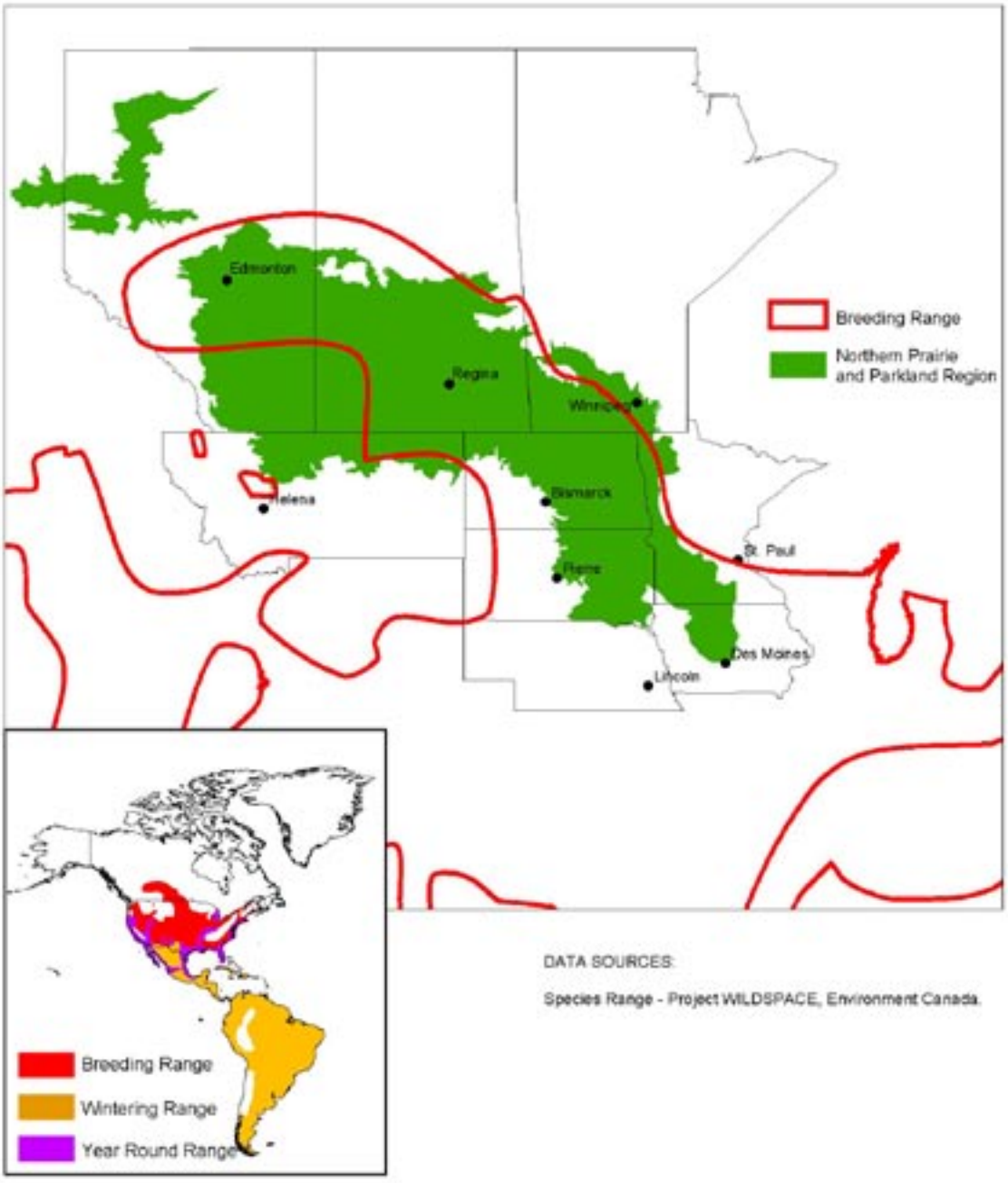
- More accurately estimate population size, distribution, and trend.
- Identify and target high priority landscapes and habitat for conservation action.

Primary regional contacts: None known.

Reference:

Davis, W. E., Jr. 1993. Black-crowned Night-heron. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 74. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Black-crowned Night Heron Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Yellow-crowned Night-Heron – *Nyctanassa violacea*
Bihoreau violace – Pedrete Enmascarado/Garza-noctuna Coroniclara

***Status Summary**:*

Continental conservation priority: Moderate Concern
Regional conservation vulnerability: **Low Risk**

Population trend	[3]
Relative abundance	[?]
Threats to breeding	[2]
Threats to non-breeding	[3]
Breeding distribution	[3]
Non-breeding distribution	[5]
Area importance of BCR11	[1]

Continental and BCR11 populations	Unknown
Population trend in BCR11	Unknown
Population trend in North America	[-0.7%/yr, p = 0.72]
Abundance status in BCR11	Rare; single small breeding area
BCR11 % of continental population	< 1%

Occurrence in NP&PR: A breeding population (small colonies and/or scattered pairs) located near western Minnesota-western Iowa border. Casual in Saskatchewan.

Habitat requirements: Selection of nesting and foraging sites varies geographically largely due to changes in habitat availability. For example, nest near water in oaks in southeast Missouri (mean nest height 18.3 m ± 0.6), in loblolly pine in coastal Virginia (mean nest height 15.2 m ± 3.7), and a variety of shorter vegetation types on the barrier and key islands. Low vegetation density under nests is characteristic of upland sites. Primarily forage on crustaceans (crabs, crayfish) and other minor food items include tadpoles and fish. Slowly walk or stand while visually searching for prey commonly within 3 m of water edge on exposed mudflats, rocky shorelines, and in shallowly flooded areas. In some regions, often use marshes with considerable edge and areas dominated by cordgrass.

Global distribution: Of six subspecies, one occurs in North America and five in Central and South America; distribution is dependent on crustacean availability (fresh- and saltwater). Breeds primarily in coastal and lowland regions. In the United States, breeding is common throughout the Florida peninsula and along the Atlantic coast to Massachusetts. Their range continues along the Gulf coast and reaches of the Mississippi River into southern portions of Missouri, Indiana, and Illinois. Some scattered populations exist as far north as Iowa, Minnesota, and Wisconsin. Wintering range includes regions of southeastern United States, Mexico, and Central America. No records outside the Americas.

Issues in NP&PR:

- None known.

***Existing action**:*

- None known.

Action needed:

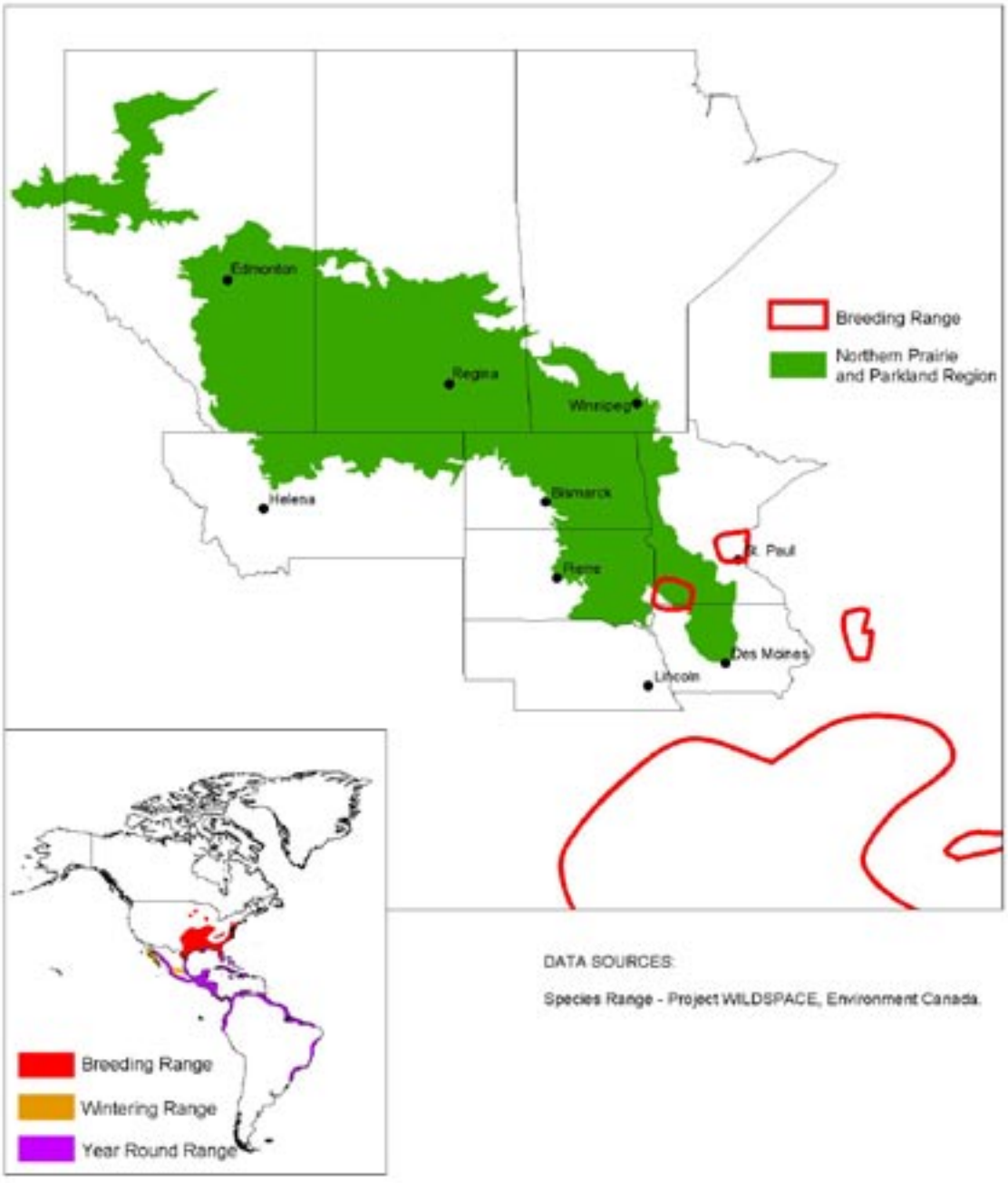
- Determine population size and distribution to serve as a baseline for monitoring future trends.

***Primary regional contacts**:* Will Meeks, USFWS.

Reference:

Watts, B. D. 1995. Yellow-crowned Night-heron. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 161. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Yellow-crowned Night Heron Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

White-faced Ibis – *Plegadis chihi*
Ibis a Face Blanche – Ibis Cariblanco

***Status Summary**:*

Continental conservation priority: Low concern
Regional conservation vulnerability: **Low Risk**

Population trend	[2]
Relative abundance	[2]
Threats to breeding	[4]
Threats to non-breeding	[3]
Breeding distribution	[3]
Non-breeding distribution	[4]
Area importance of BCR11	[1]

Continental and BCR11 populations	>100,000;	Unknown but small
Population trend in BCR11	[unknown]	
Population trend in North America	[29.9%/yr, p = 0.01]	
Abundance status in BCR11	Rare	
BCR11 % of continental population	< 1%	

Occurrence in NP&PR: Rare, localized breeder in the NP&PR; reclaimed and expanded range in 1980s and 1990s following precipitous declines in 1960s and 1970s caused by habitat loss and pesticide contamination. Established in small numbers at a few sites across Canadian prairies. In Canadian portion of region, breeding documented at only 6 sites: Pakowki Lake, Kininvie marsh, Stirling Lake, and Frank Lake in Alberta, and Old Wives Lake and Paysen Lake in Saskatchewan.

Habitat requirements: Found in large shallow marshes with scattered patches of emergent vegetation, particularly hard stem bulrush and cattail. Often feeds in flooded fields and shallow wetlands. Typically nests in emergent vegetation, occasionally on islands or low trees or shrubs surrounded by water.

Global distribution: Local breeder throughout Plains, Great Basin, and Intermountain West; northernmost breeding range in Alberta. Common breeder in southern California and along Gulf Coast of U.S. Winters in Mexico and central America; also breeds as far south as central Chile and Argentina.

Issues in NP&PR:

- Recovery from earlier population decline.
- Botulism outbreaks on lakes with breeding populations may result in losses to the recovering and pioneering White-faced Ibis population.

Existing action:

- Ongoing wetland conservation programs.

Action needed:

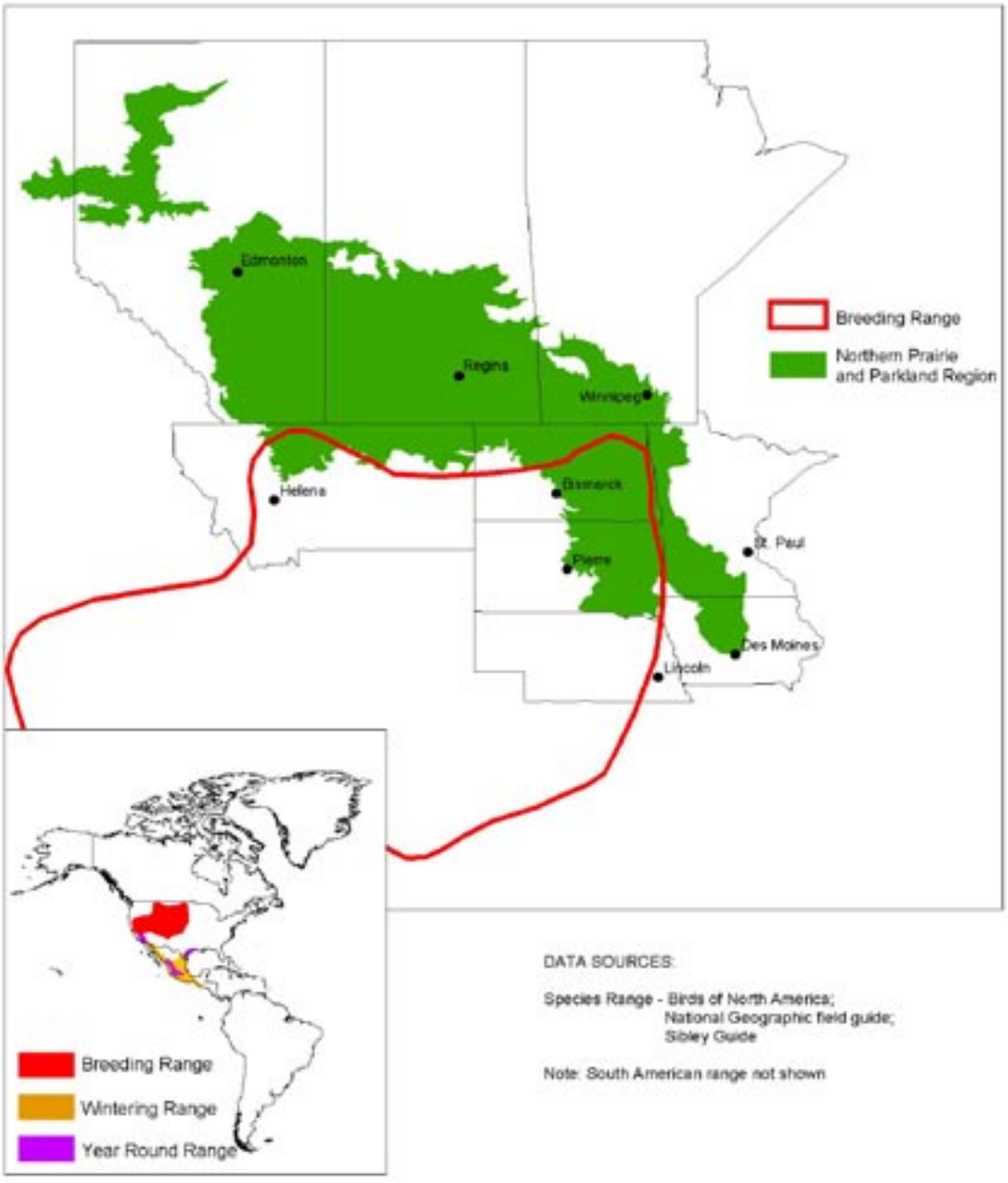
- Determine population size and distribution to serve as a baseline for monitoring future trends.

***Primary regional contacts**:* Gregg Knutsen, USFWS.

Reference:

Ryder, R. R., and D. E. Manry. 1994. White-faced Ibis. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 130. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

White-faced Ibis Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Birds of North America;
National Geographic field guide;
Sibley Guide

Note: South American range not shown

Yellow Rail - *Coturnicops noveborcensis*
Râle Jaune - Polluela Amarilla

***Status Summary*:**

Regional conservation vulnerability: **High Concern**

Population trend	[3]
Relative abundance	[4]
Threats to breeding	[4]
Threats to non-breeding	[4]
Breeding distribution	[3]
Non-breeding distribution	[5]
Area importance of BCR11	[3]

Continental and BCR11 populations:	7,000 - 10,000? ;	Unknown
Population trend in BCR11:	Unknown	
Population trend in North America:	Unknown	
Abundance status in BCR11:	Uncommon and local, but may be locally abundant	
BCR11 % of continental population:	Unknown	

***Occurrence in NP&PR*:** Occurs throughout the northern part of the region south to northeastern Montana and central North Dakota. An uncommon and locally distributed breeder that is more often heard than seen. More common in the northern parkland portions of the NP&PR than in the southern grassland areas. Non-colonial, but multiple birds often found together in patches of suitable habitat. Some spring-fed sites consistently contain significant numbers each year, but occurrence at many other sites is unpredictable. One site in Manitoba had a one-day count of 105 calling birds. Poorly known in most areas, because it is highly nocturnal and is only found at low densities.

***Habitat requirements*:** A habitat specialist. Requires sedge marshes or fens with shallow standing water 0-12 cm) and where the substrate remains moist throughout the summer. Nests are usually built over standing water. Prefers areas with less woody vegetation such as willows. Can be found in wet fields and meadows and the floodplains of streams and occasionally in areas dominated by grass, rushes or bulrushes rather than sedge. Spring-fed areas and other sites with steady water supply are more regularly occupied, especially in southern portions of the region. Also found in hay fields and wet meadows during migration.

***Global distribution*:** Found only in North America. Widely but locally distributed east of the Rocky Mountains in Canada and the northern United States during the breeding season. Winters in coastal marshes from South Carolina to south Texas.

***Issues in NP&PR*:**

- Sites regularly occupied by breeding birds are poorly known.
- Drainage of wet (sedge) meadows, temporary, and seasonal wetlands in Drift Prairie.
- Agricultural runoff, particularly pesticides, may affect wet meadow communities.

***Existing action*:**

- Listed as species of special concern in Alberta, Saskatchewan, Manitoba (COSEWIC), and Minnesota.
- Province-wide survey was conducted in Alberta in 2000.
- A review of the effects of management practices on this species is available from the Northern Prairie Wildlife Research Center.

Action needed:

- Conserve and restore sedge meadows.
- Manage to reverse encroachment of woody vegetation into wet meadows.
- Consider placement of towers, wires, or other structures away from wetlands used by rails.

***Research needs*:**

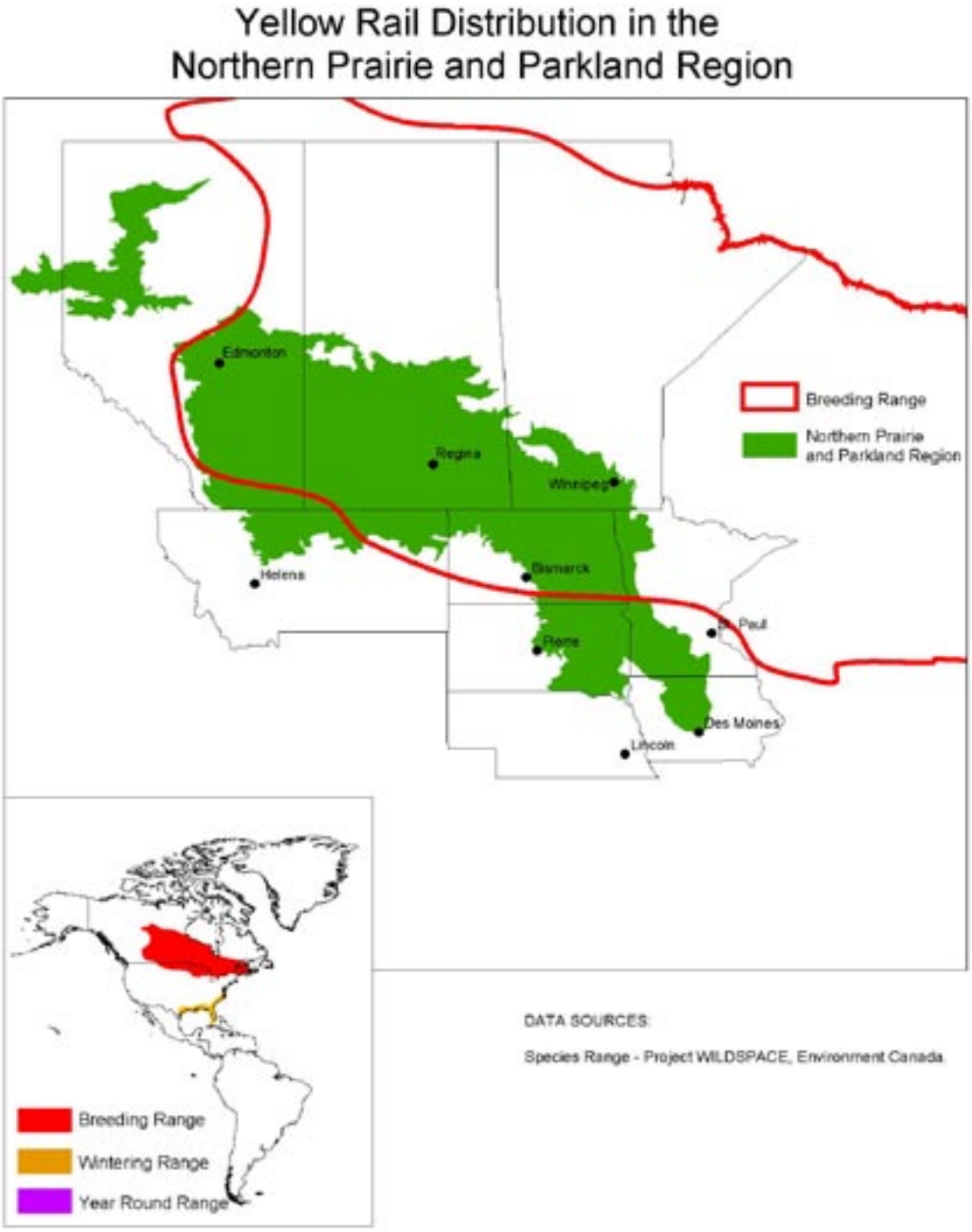
- Development of effort-efficient survey techniques,
- Develop better understanding of habitat selection and population size as they relate to wetland size, wetland characteristics, and wetland vegetation.

- Identify factors influencing site fidelity and breeding success.
- Identify key sites with large populations and establish population monitoring at selected sites.
- Determine influence of water level fluctuation, wetland restoration, and management practices such as burning, mowing, and grazing.

***Primary regional contacts*:** Michel Robert, CWS; David Prescott, Alberta Fish & Wildlife Division; Mike Norton, CWS.

Reference:

Bookhout, T. A. 1995. Yellow Rail. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 139. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Black Rail – *Laterallus jamaicensis*
Rale noir – Gallinetia negra/Polluela Negra

***Status Summary**:*

Regional conservation priority: **Moderate Concern**

Population trend	[4]
Relative abundance	[5]
Threats to breeding	[4]
Threats to non-breeding	[4]
Breeding distribution	[4]
Non-breeding distribution	[4]
Area importance of BCR11	[1]

Continental and BCR11 populations	Unknown
Population trend in BCR11	Unknown
Population trend in North America	Unknown
Abundance status in BCR11	Very rare, but not well known
BCR11 % of continental population	< 1%?

Occurrence in NP&PR: Distribution patchy, inconsistent, and poorly known. Sparse or casual in summer in Iowa, southern Minnesota, and extreme southeastern South Dakota. Black Rail may breed in NP&PR, but no confirmed nests found. However, Black Rail is so secretive that nests are rarely found in any area.

Habitat requirements: Uses wetlands with fine-stemmed emergent vegetation such as wet meadows, shallow marshes, flooded fields, and sedge meadows. Uses sites with shallower water than other North American rails.

Global distribution: Poorly known. In addition to scattered North American populations, also found in Mexico, Caribbean islands, and portions of South America.

Issues in NP&PR:

- Distribution poorly known.
- Loss of shallow, easily drained wetland habitat.
- May be especially susceptible to contaminants given insectivorous feeding habits.

***Existing action**:*

- None known.

Action needed:

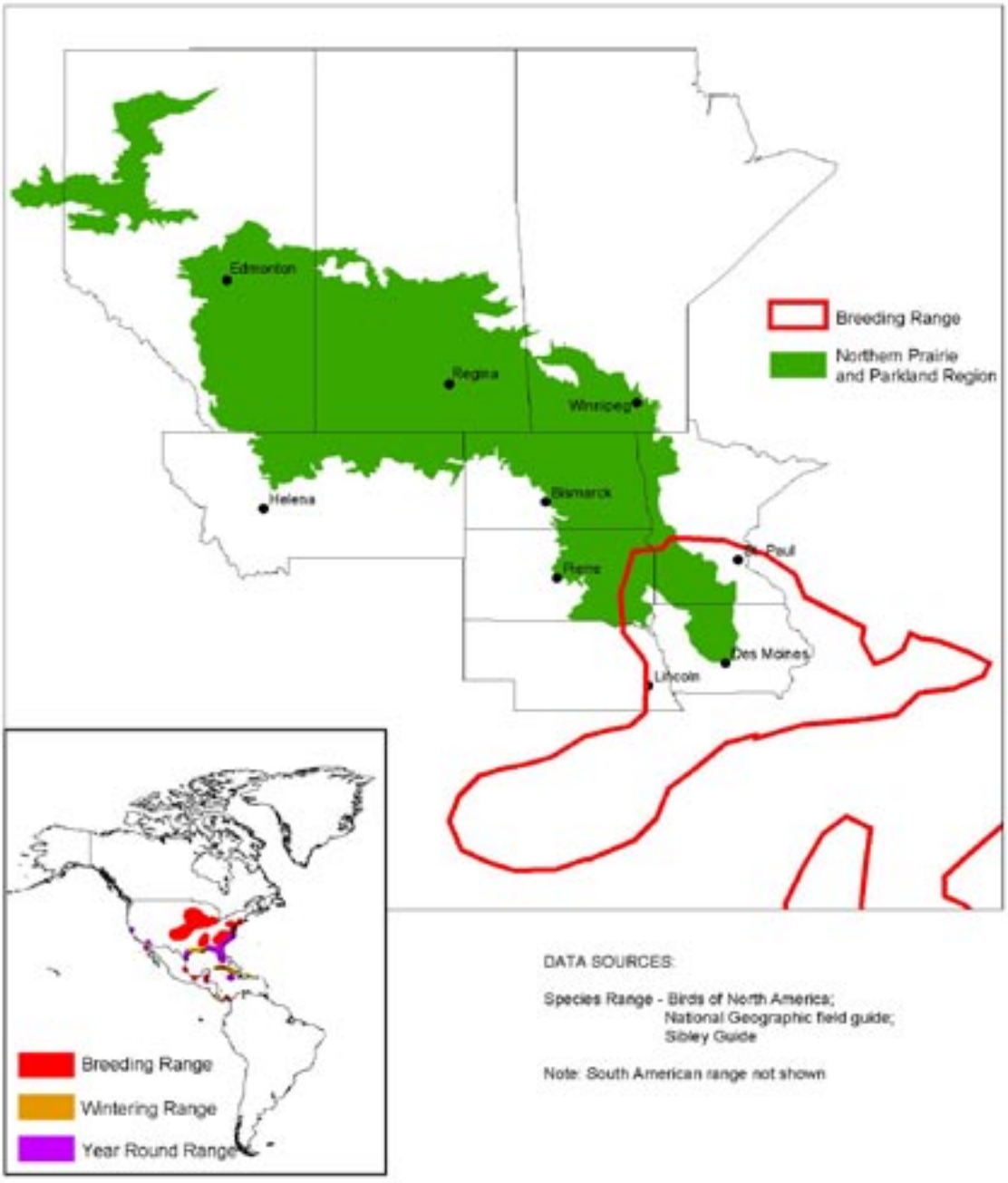
- Assess status in region: distribution, abundance, and breeding status.

***Primary regional contacts**:* Jim Dinsmore, Iowa State University.

Reference:

Eddleman, W. R., R. E. Flores, and M. L. Legare. 1994. Black Rail. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 123. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Black Rail Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Birds of North America;
National Geographic field guide;
Sibley Guide

Note: South American range not shown

King Rail – *Rallus elegans*
Rale Elegant – Rascón Elegante/ Rascón Real

***Status Summary**:*

Regional conservation vulnerability: **High Concern**

Population trend	[3]
Relative abundance	[4]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[2]
Non-breeding distribution	[4]
Area importance of BCR11	[3]

Continental and BCR11 populations	Unknown
Population trend in BCR11	Unknown
Population trend in North America	[-6.2%/yr, p = 0.01]
Abundance status in BCR11	Rare
BCR11 % of continental population	10-24%?

Occurrence in NP&PR: Breeds in Iowa, extreme southeastern North Dakota, southern Minnesota, and eastern South Dakota. Accurate population estimates or density estimates are not available across most of the range.

Habitat requirements: Freshwater and locally brackish marshes; successional stages of marsh-shrub swamp, rice fields, flooded farmland, river margins, and upland fields near marshes are needed. Preferred vegetation types include grasses, sedges, rushes, and cattails.

Global distribution: Restricted to North America, with subspecies in Cuba and central Mexico. King Rails nest from eastern South Dakota and southern Minnesota east to Long Island and, except for the Appalachians, south to Florida, the Gulf Coast and Cuba. Winter range includes lower Mississippi River Valley, the Gulf Coast, Cuba, and Florida.

Issues in NP&PR:

- Population decline often attributed to habitat loss, which may have cumulative impacts.
- Complex of wetland habitats is necessary for population survival. Large reduction in herbaceous floodplain wetlands through agricultural, urban and industrial developments is a direct threat to populations.
- As a nocturnal migrant, individuals strike illuminated structures such as television towers, tall buildings, and lighthouses.

Existing action:

- Listed as Endangered in Iowa and Minnesota.

Research needs: Partial list of needs identified by Reid et al. (1994) includes:

- Evaluate population assessment techniques.
- Evaluate King Rail habitat use at primary wintering, migration, and breeding areas.
- Determine effect of harvest regulations on harvest and annual survival.

Action needed:

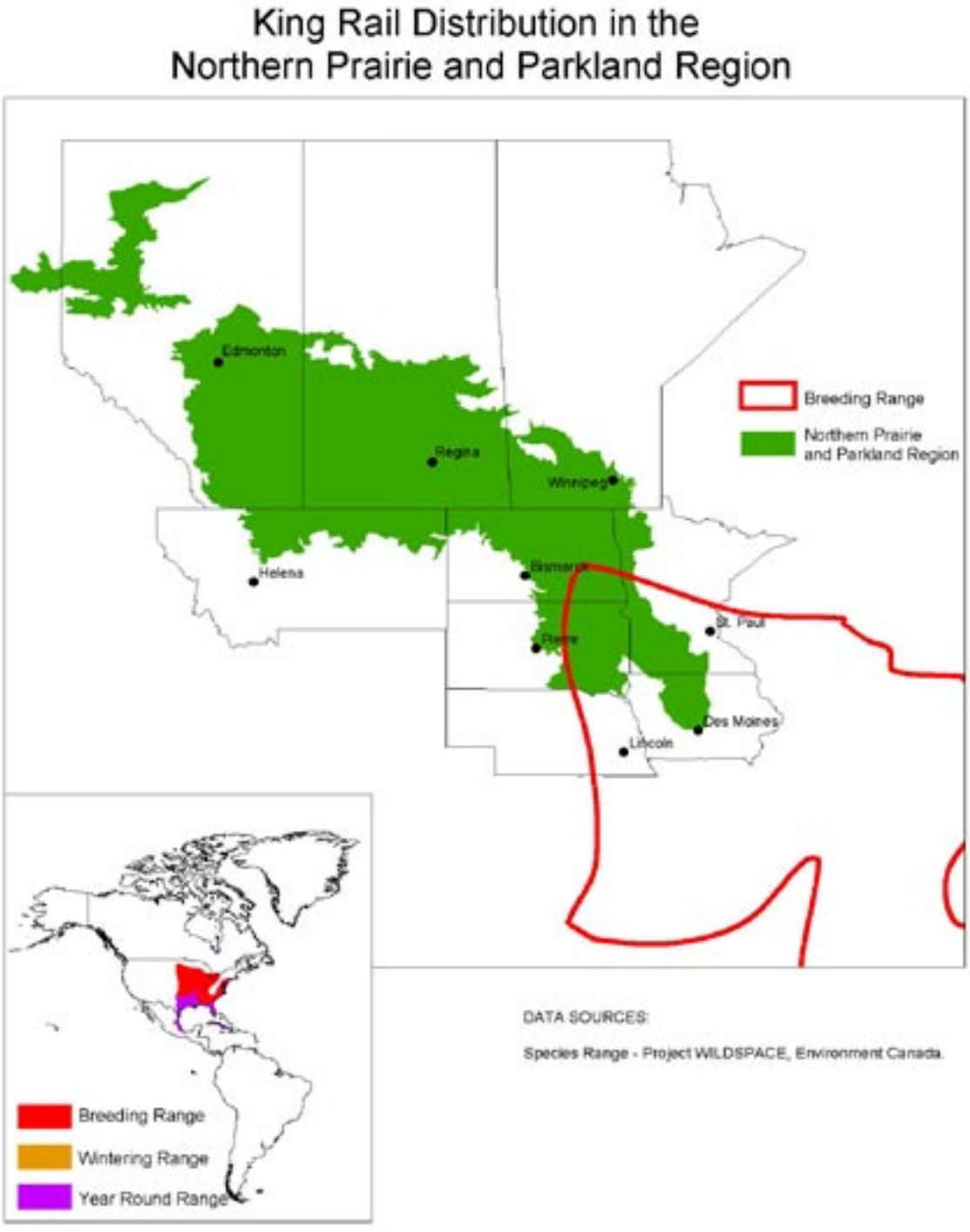
- More accurately estimate population size, distribution, and trend.
- Identify and target high priority habitats and landscapes for conservation action.
- Consider placement of towers, wires, or other structures away from wetlands used by rails.
- Improve existing, or construct new, wetland habitat for King Rails while protecting the natural drying process of small depressions during the King Rail brood period.

***Primary regional contacts**:* Jim Dinsmore, Iowa State University; Spencer Vaa, South Dakota Game, Fish, & Parks; Richard Bishop, Iowa DNR; Steve Maxson, Minnesota DNR.

References:

Meanley, B. 1992. King Rail. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 3. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Reid, F. A., B. Meanley, and L. H. Fredrickson. 1994. King Rail. Pages 181-191 *in* T. C. Tacha and C. E. Braun, eds. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.



Virginia Rail - Rallus limicola
Râle de Virginie - Rascón de Virginia

***Status Summary*:**

Regional conservation vulnerability: **Moderate Concern**

Population trend	[3]
Relative abundance	[4]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[2]
Area importance of BCR11	[2]

Continental and BCR11 populations:	Unknown
Population trend in BCR11:	[17.4%/yr, p = 0.20]
Population trend in North America:	[4.2%/yr, p < 0.01]
Abundance status in BCR11:	Fairly uncommon and local
BCR11 % of continental population:	< 10%?

***Occurrence in NP&PR*:** Occurs throughout the region. A relatively uncommon breeder that is more often heard than seen, but which can be locally quite common. Possibly more abundant in northern parkland portions of the NP&PR, but occurs throughout the grassland region in larger marshes. Poorly known in most areas due to elusive and nocturnal nature; may be more common than records suggest.

***Habitat requirements*:** Nests in freshwater marshes with significant emergent vegetation and shallow water (0-15cm). Bulrush, cattail, and sedge marshes are all used. Requires standing water, moist soil, or mudflats for foraging, but will use deeper water areas if sufficient vegetation exists to walk on. Prefers wetlands with 40-70% upright emergent vegetation interspersed with open water or mudflats.

***Global distribution*:** Found only in North America. Breeds locally across southern Canada, and in the northeast, central and northwestern United States. More common in areas outside of NP&PR. Winters along east, west and Gulf coasts of the United States, in west-central United States, and Mexico.

***Issues in NP&PR*:**

- Abundance, distribution and population trend poorly understood.
- Cattail encroachment on prairie wetlands.

***Existing action*:**

- Province-wide survey conducted in Alberta in 2000.
- Considered a game bird in several states, harvest estimates are developed through hunter surveys (USFWS Migratory Bird Harvest Information Program).
- A review of the effects of management practices on this species is available from the Northern Prairie Wildlife Research Center.

Research needs: (additional needs listed in Conway and Eddleman [1994]).

- More accurately estimate population size, distribution, and trend.
- Determine habitat selection at local and broad spatial scales.
- Determine how site occupancy varies over time, and factors influencing occupancy.
- Determine effectiveness of BBS at monitoring Virginia Rail populations.

***Action needed*:**

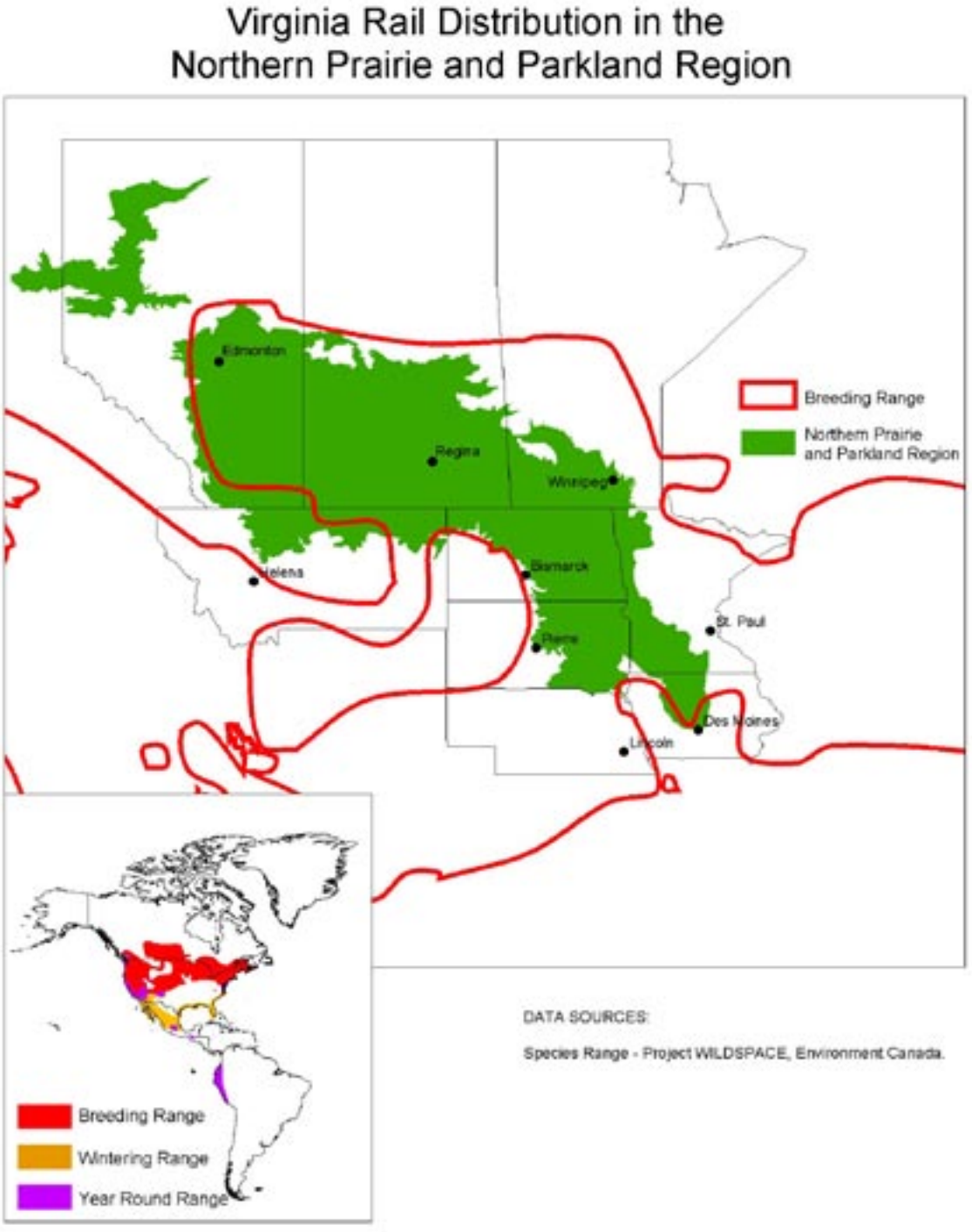
- Identify and target high priority habitats and landscapes for conservation action.
- Increase sample size of Harvest Information Program to ensure accurate harvest estimates.
- Consider placement of towers, wires, or other structures away from wetlands used by rails.

***Primary regional contacts*:** Steve Fairbairn, USFWS; Jim Hansen, Montana Fish, Wildlife, & Parks; Stan Kohn, North Dakota Game & Fish; Spencer Vaa, South Dakota Game, Fish, & Parks; Richard Bishop, Iowa DNR; Steve Maxson, Minnesota DNR; Michael Norton, CWS; David Prescott, Alberta Fish & Wildlife.

References :

Conway, C. J. 1995. Virginia Rail. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 173. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Conway, C. J., and W. R. Eddleman. 1994. Virginia Rail. Pages 193-206 *in* T. C. Tacha and C. E. Braun. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.



Sora - Porzana carolina
Marouette de Caroline - Gallineta de Cienaga/Polluela Sora

***Status Summary*:**

Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[3]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[1]
Area importance of BCR11	[5]

Continental and BCR11 populations:	Unknown
Population trend in BCR11:	[2.21%/yr., p = 0.07]
Population trend in North America:	[1.3%/yr., p = 0.07]
Abundance status in BCR11:	Common, but not abundant, in suitable habitat
BCR11 % of continental population:	> 50%

***Occurrence in NP&PR*:** Occurs throughout the region. The most common rail in the region, but rarely seen because of its secretive nature. Any wetland area containing suitable habitat is likely to contain Soras. The highest densities reported by the Breeding Bird Survey are centered on the NP&PR, particularly the northern prairie and parkland in Canada and North Dakota. Local density estimates of 0.1 - 1.6 birds/ha have been estimated for wetlands in American portions of the region.

***Habitat requirements*:** Nests in freshwater marshes with shallow to intermediate water depths, especially seasonal and semi-permanent wetlands. Cattail, sedge, and bulrush-dominated marshes are all used. Highest breeding densities are found in shorelines where varying water levels produces a mosaic of vegetation. Soras appear to be relatively area-independent in their selection of wetlands, and may use wetlands as small as < 0.5 ha.

***Global distribution*:** Found only in North America. Breeds across North America south of the tree line from southern Mackenzie and eastern Quebec to California and Maryland. Winters along east and west coasts of the southern United States, through Mexico to northern South America. Densest wintering populations around American coast of Gulf of Mexico and lower Colorado River valley of southwest Arizona.

***Issues in NP&PR*:**

- Loss of small wetlands.
- Cattail encroachment on prairie wetlands.

***Existing action*:**

- Considered a game bird in several states, harvest estimates are developed through hunter surveys for rails (USFWS Migratory Bird Harvest Information Program).
- A review of the effects of management practices on this species is available from the Northern Prairie Wildlife Research Center.

Research needs: Needs taken in part from Melvin and Gibbs (1994).

- Determine effectiveness of BBS at monitoring Sora populations.
- Determine effects of environmental factors on Sora reproductive success.
- Develop reliable survey techniques for Sora.

***Action needed*:**

- Identify and target high priority habitats and landscapes for conservation action.
- Increase sample size of Harvest Information Program to ensure accurate harvest estimates.
- Consider placement of towers, wires, or other structures away from wetlands used by rails.

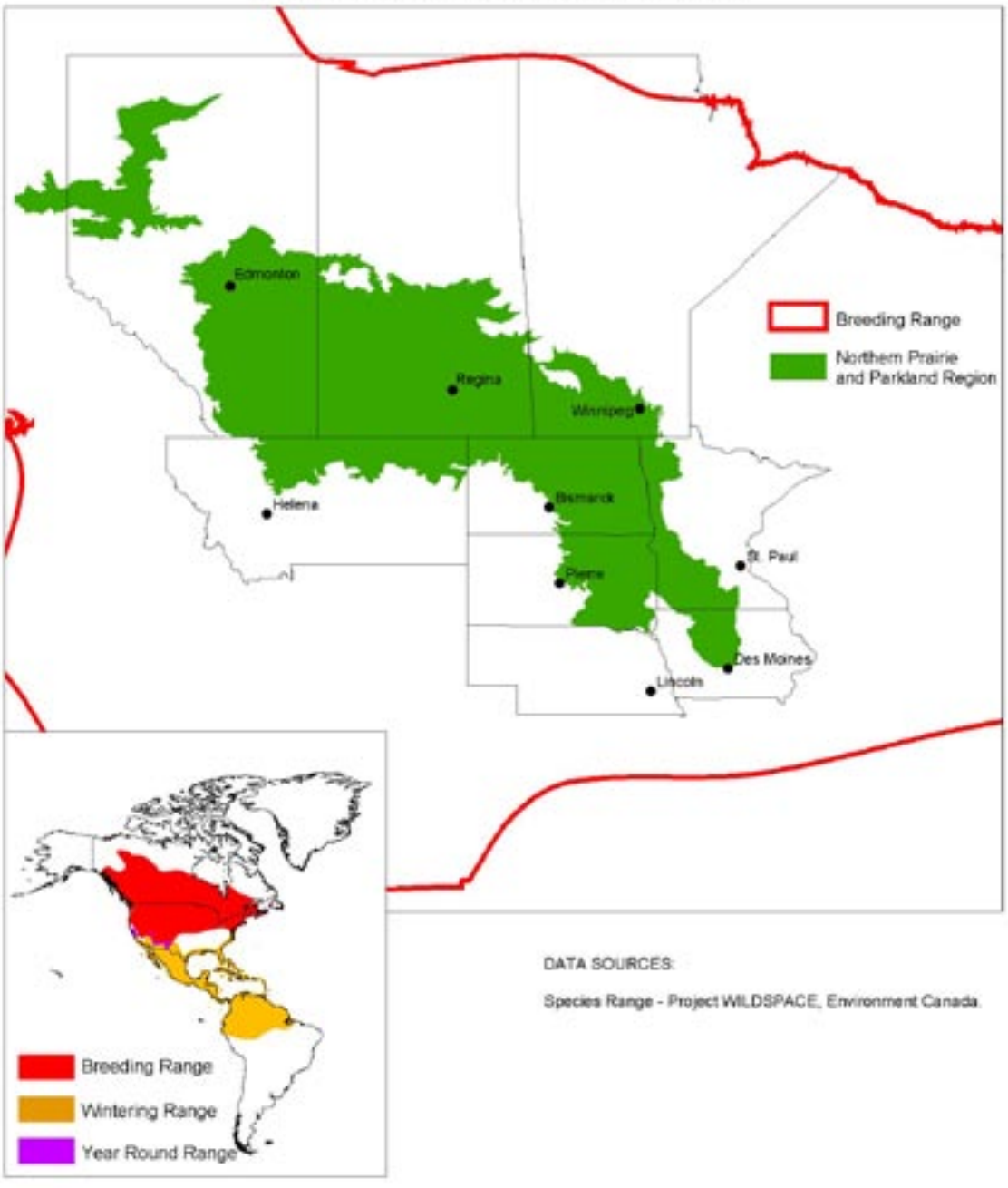
Primary regional contacts: Steve Fairbairn, USFWS.

References:

Melvin, S. M., and J. P. Gibbs. 1999. Sora. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 250. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Melvin, S. M., and J. P. Gibbs. 1994. Sora. Pages 209-217 in T. C. Tacha and C. E. Braun, eds. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.

Sora Distribution in the Northern Prairie and Parkland Region



Common Moorhen – *Gallinula chloropus*
French Common Name – Gallineta Común

***Status Summary**:*

Regional conservation vulnerability: **Low Risk**

Population trend	[3]
Relative abundance	[3]
Threats to breeding	[2]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[1]
Area importance of BCR11	[3]

Continental and BCR11 populations	Unknown
Population trend in BCR11	Unknown
Population trend in North America	[3.2%/yr, p = 0.15]
Abundance status in BCR11	Rare
BCR11 % of continental population	10-24%

Occurrence in NP&PR: Non-colonial breeder in South Dakota, Iowa, and Minnesota. Casual in North Dakota. Density, distribution, and trends difficult to determine due to secretive nature.

Habitat requirements: Typically uses freshwater wetlands with areas of robust emergent vegetation, interspersed with deep, open water for nesting and areas of submerged aquatic and floating vegetation for foraging. Over-water nesting commonly occurs in depths up to 1 m. Opportunistically feeds on both plant and animal (primarily invertebrate) matter.

Global distribution: Moorhens inhabit all continents except Australia. *G. c. cachinnans*, one of 13 subspecies, occurs in North and Central America. Widely distributed throughout North America and Canada, but local populations vary depending on the availability of habitat. Winters in eastern US. from South Carolina and Gulf coast south throughout breeding range elsewhere in Americas.

Issues in NP&PR:

- A gamebird in some states of the region; distribution, population size, and harvest should be monitored for proper management.

***Existing action**:*

- Poorly sampled by existing surveys; distribution and population size poorly known.
- Listed as species of special concern in Minnesota.

Research needs: A partial list of needs identified by Greij (1994) includes:

- Determine habitat selection and identify key wetland complexes.
- Develop better population indices and determine population trends.
- Determine effects of hunting and changes in regulations on moorhen populations.

Action needed:

- More accurately estimate population distribution, size, and trend.
- Identify, conserve, and manage wetlands for moorhens and other species.

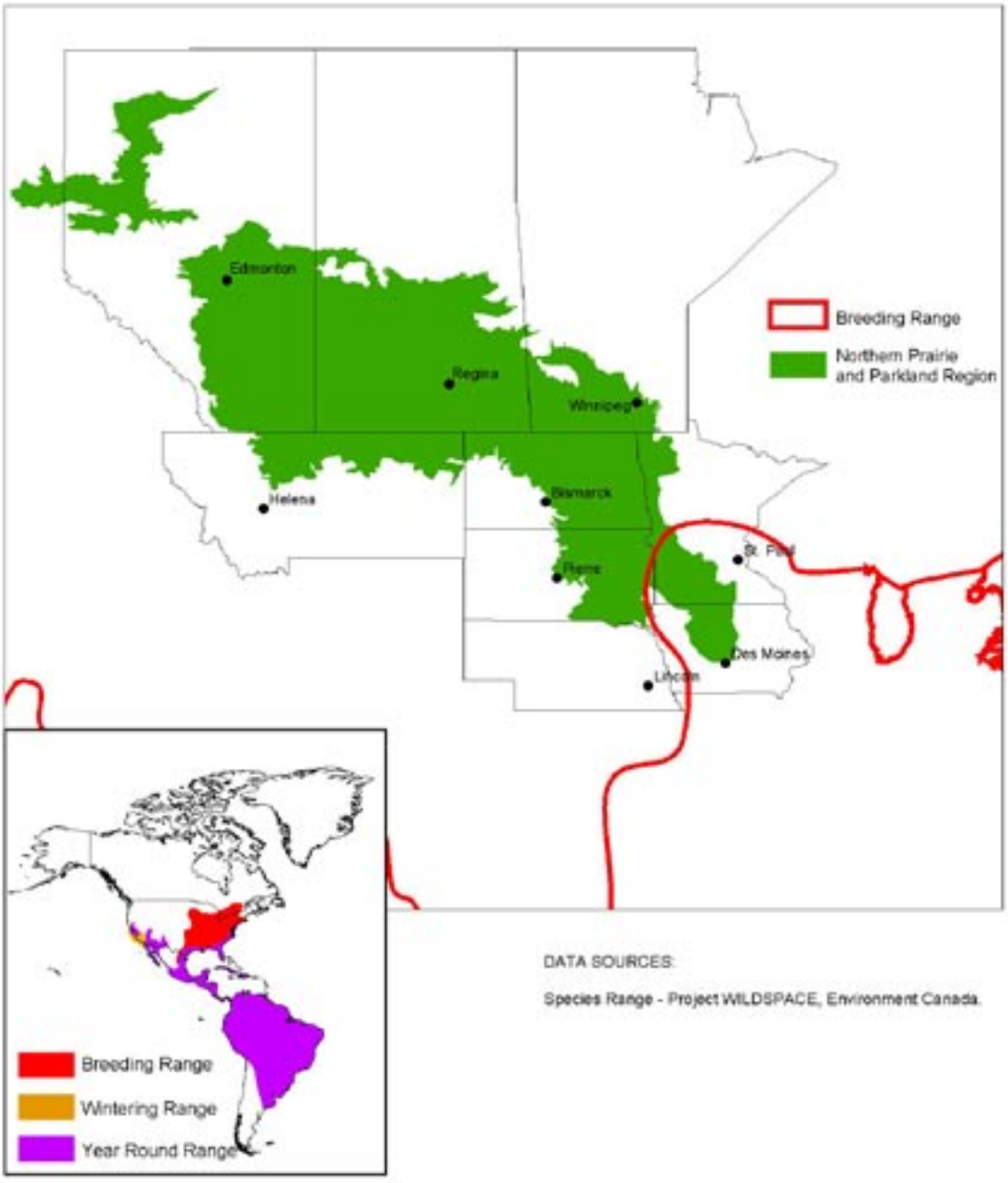
***Primary regional contacts**:* Jim Dinsmoore, Iowa State University; Spencer Vaa, South Dakota Game, Fish, & Parks; Richard Bishop, Iowa DNR; Steve Maxson, Minnesota DNR.

***Reference**:*.

Greij, E. D. 1994. Common Moorhen. Pages 145-157 *in* T. C. Tacha and C. E. Braun, Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.

A Birds of North America account for Common Moorhen has not yet been published.

Common Moorhen Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

American Coot – *Fulica americana*
Foulque d'amerique - Focha americana/Gallareta americana

***Status Summary**:*

Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[3]
Threats to breeding	[2]
Threats to non-breeding	[1]
Breeding distribution	[1]
Non-breeding distribution	[1]
Area importance of BCR11	[5]

Continental and BCR11 populations	~3,000,000 in North America
Population trend in BCR11	[3.26%/yr, p = 0.04]
Population trend in North America	[0.9 %/yr, p = 0.32]
Abundance status in BCR11	Abundant throughout
BCR11 % of continental population	> 50%

Occurrence in NP&PR: American Coot breeds throughout NP&PR. Breeding Ground Surveys provide relative indices of American Coot abundance, most of which occur in the prairie-parkland region, particularly in the Canadian parklands and eastern Dakotas. Populations correlated with wetland numbers. Non-colonial breeder.

Habitat requirements: Well-flooded, persistent, freshwater wetlands (preferably semi-permanent wetlands) with good interspersion of emergent vegetation and open water. Preferred vegetation includes cattail and bulrush. Whitetop rivergrass, sedges, and willows are also used, especially in wet years.

Global distribution: Restricted to New World with subspecies found in Hawaii and South America. In North America species is considered abundant. North American populations have increased since breeding-ground surveys began in 1950's, although reliability of estimates unknown. North American populations winter along Pacific coast, inland in southwestern U.S., lower Ohio Valley, and Maryland, south through Middle America, the West Indies, possibly to northern Colombia. Occasional on Hawaii.

Issues in NP&PR:

- Maintenance and management of productive wetland habitats in California, Mexico, Texas, Louisiana, Mississippi, and Florida, which are important to over-winter survival.

***Existing action**:*

- American Coot is surveyed on May Breeding Waterfowl Surveys.
- Harvest of American Coot is estimated as part of Harvest Information Program.

Research needs: Partial list of needs identified by Alisauskas and Arnold (1994) include

- Assess accuracy of Breeding Bird Survey and May Waterfowl Breeding Survey.
- Determine sources of variation in recruitment.
- Examine disease dynamics of American Coot.

Action needed:

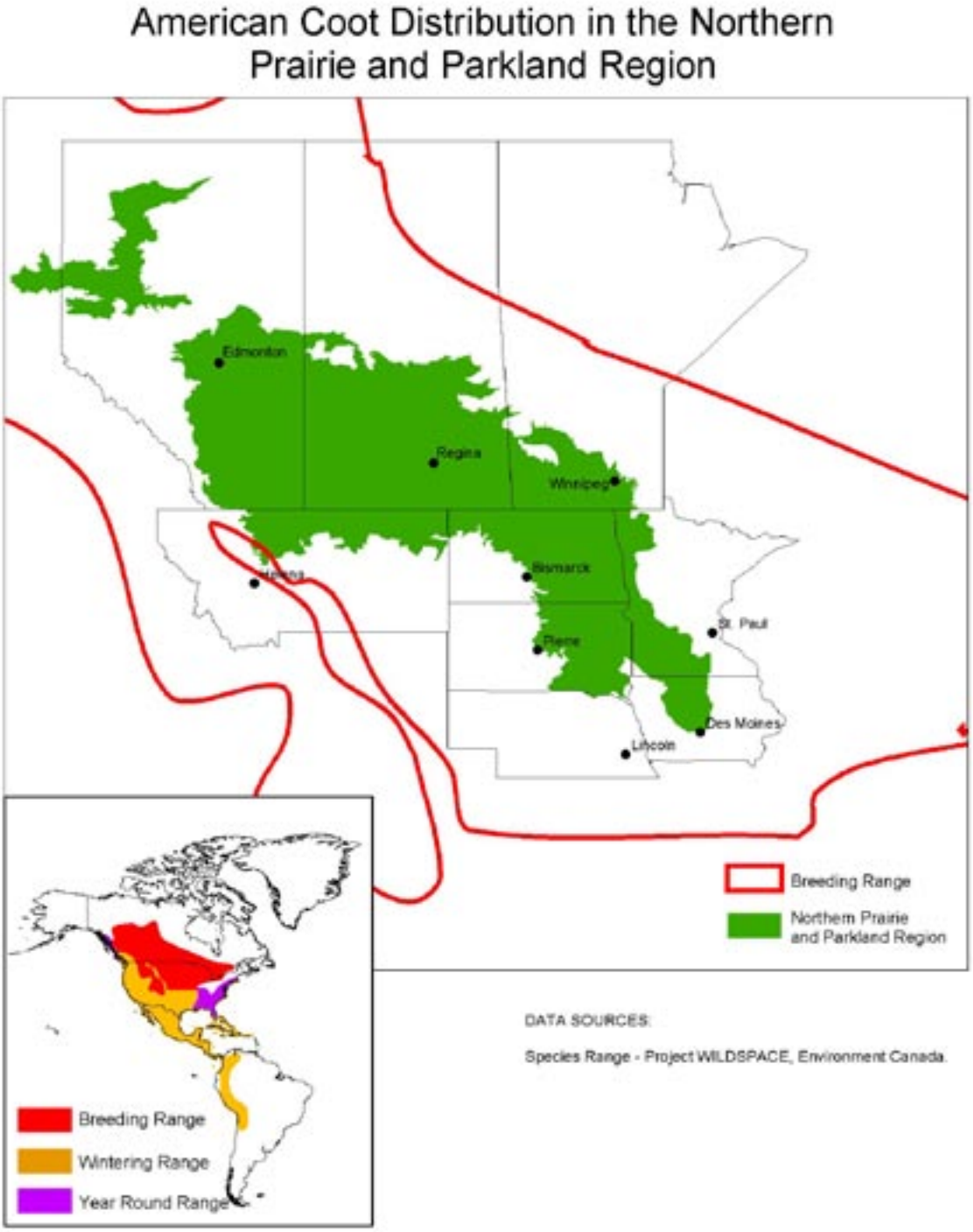
- Assess harvest, abundance and distribution of coots in Mexico.
- Band all American Coots captured opportunistically during all regularly scheduled waterfowl banding efforts.
- Ensure that Migratory Bird Harvest Information Program is able to obtain reliable estimates of American Coot harvest in the United States.

***Primary regional contacts**:* Richard D. Crawford, University of North Dakota; Wendy Reed, North Dakota State University; Todd W. Arnold, University of Minnesota; Jim Hansen, Montana Fish, Wildlife, & Parks; Stan Kohn, North Dakota Game & Fish; Spencer Vaa, South Dakota Game, Fish & Parks; Richard Bishop, Iowa DNR; Steve Maxson, Minnesota DNR.

References:

Alisauskas, R. T., and T. W. Arnold. 1994. American coot. Pages 127-143 *in* T. C. Tacha and C. E. Braun, editors. 1994. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.

A Birds of North America account for American Coot has not yet been published.



Sandhill Crane – *Grus canadensis*
Grue Canadienne – Grulla Gris

***Status Summary**:*

Regional conservation vulnerability: **Low Risk**

Population trend	[3]
Relative abundance	[3]
Threats to breeding	[3]
Threats to non-breeding	[3]
Breeding distribution	[2]
Non-breeding distribution	[4]
Area importance of BCR11	[1]

Continental and BCR11 populations	652,500 - 715,300; Unknown
Population trend in BCR11	[5.22%/yr, p = 0.49]
Population trend in North America	[6.9%/yr., p = 0.0001] Most populations including the large Mid-continent and Western populations are increasing. The BBS showed a 230.3% increase (p < 0.01) from 1966-1993.
Abundance status in BCR11	Rare breeder. Abundant migrant.
BCR11 % of continental population	<1% breeding.

Occurrence in NP&PR: Non-colonial. Breeds predominantly on the northern periphery of the NP&PR and northward. Formerly bred more widely. Abundant migrant in spring and fall.

Habitat requirements: Breeds in large marshes, muskegs of the boreal forest, and wet sedge meadows of the tundra region. It is now rare and local in the marshes of parkland and grassland regions. Migrants favor large shallow lakes or river bars for night roosts and feed largely in grain fields.

Global distribution: Small resident populations occur in the southeastern U.S. and western Cuba with larger migratory populations occurring from Oregon and the Great Lakes regions northward through the boreal forest and tundra regions from Hudson's and James Bays and Baffin Island, westward to eastern Siberia. The wintering grounds extend from central California and Texas south into northern Mexico and along the U.S. gulf coastline.

Issues in NP&PR:

- Depredation of cereal crops is a problem in some areas.

Existing action:

- Gamebird in two provinces and three states. Population estimates are developed through spring migration surveys on staging areas of the Platte River. Harvest levels are monitored through hunter surveys such as the USFWS Migratory Bird Harvest Information Program.
- Management guidelines of the Central and Pacific flyways for the mid-continent population of Sandhill Cranes developed (1993) and being implemented.

Research needs: Prioritized needs in Tacha et al. (1994) pertinent to NP&PR include

- Determine factors influencing recruitment.
- Estimate unretrieved harvest.
- Identify factors influencing recruitment.
- Develop and test techniques to reduce crop depredation.

Action needed: Prioritized recommendations in Tacha et al. (1994) pertinent to NP&PR include

- Assess harvest and populations.
- Preserve key habitat.

***Primary regional contacts**:* Gary Krapu, Northern Prairie Wildlife Research Center; Jim Hansen, Montana Fish, Wildlife, & Parks; Stan Kohn, North Dakota Game & Fish; Spencer Vaa, South Dakota Game, Fish, & Parks; Richard Bishop, Iowa DNR; Steve Maxson, Minnesota DNR.

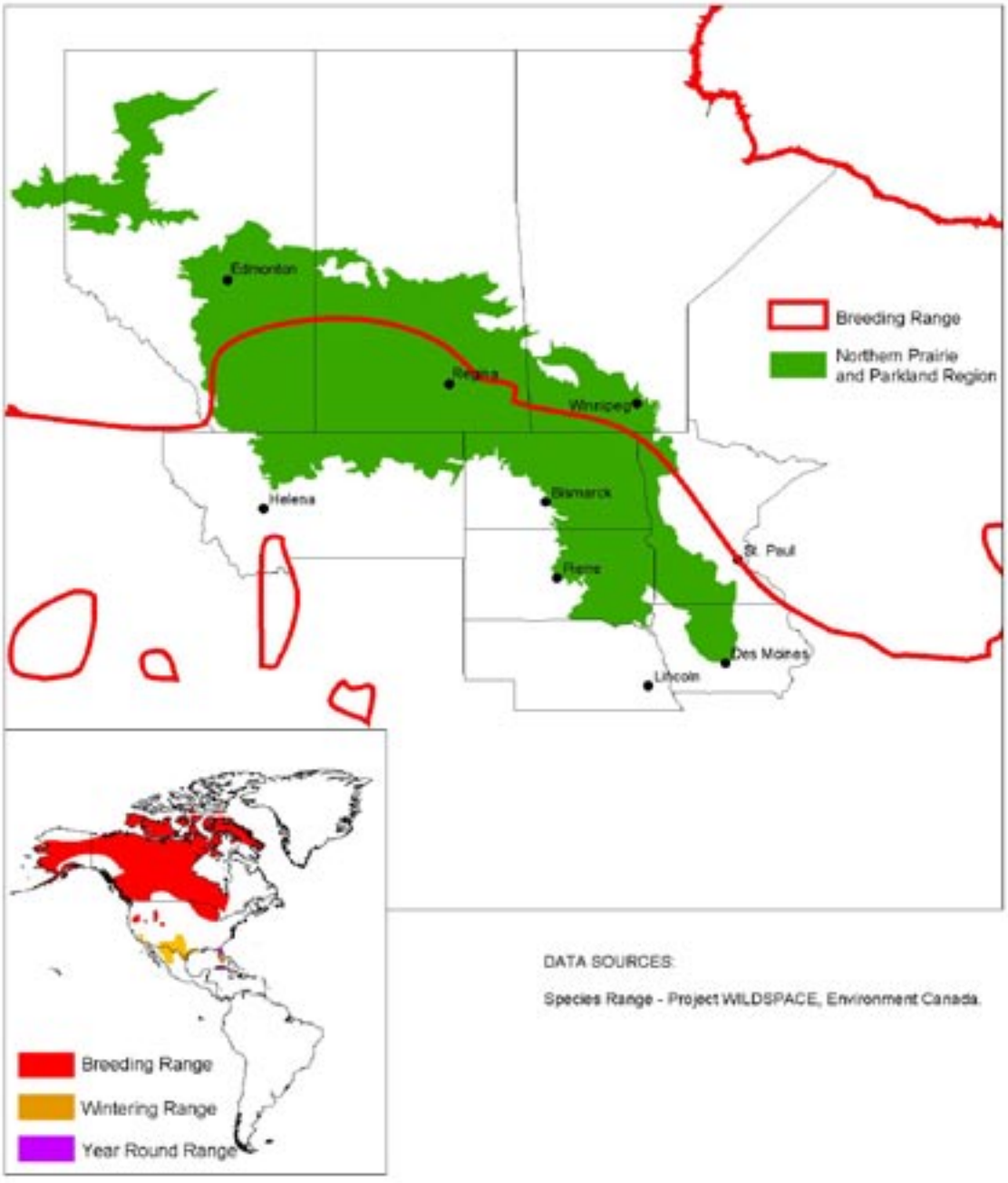
References:

Central Migratory Shore and Upland Game Bird Technical Committee. 1993. Management Guidelines of the Central and Pacific Flyways for the Mid-continent Population of Sandhill Cranes. Committee report prepared for the Central and Pacific Flyway Waterfowl Councils and the U.S. Fish and Wildlife Service, 19 pages + appendices.

Tacha, T. C., S. A. Nesbitt, and P. A. Vohs. 1992. Sandhill Crane. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 31. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Tacha, T. C., S. A. Nesbitt, and P. A. Vohs. 1994. Sandhill crane. Pages 77-94 *in* T. C. Tacha and C. E. Braun, editors. 1994. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.

Sandhill Crane Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Whooping Crane - *Grus americana*
Grue blanche d'Amérique - Grulla Blanca

***Status Summary*:**

Regional conservation vulnerability: **Listed**

Population trend	[5]
Relative abundance	[5]
Threats to breeding	[5]
Threats to non-breeding	[5]
Breeding distribution	[5]
Non-breeding distribution	[5]
Area importance of BCR11	N/A

Continental and BCR11 populations:	Continental: 419 (300 wild, 119 captive) Regional: 194 (Wood Buffalo-Aransas population, migrate through BCR11)
Population trend in BCR11:	N/A
Population trend in North America:	[0.1%/yr., p = 0.92]
Abundance status in BCR11:	Rare migrant
BCR11 % of continental population:	N/A

***Occurrence in NP&PR*:** Occurs in the region as a scarce but regular migrant during both spring and fall. During fall, migrating groups of birds stage and forage for periods of one day to several weeks at staging areas. An area of 85,000 square km in Saskatchewan constitutes the principal fall staging area for the species. Spring migration, however, tends to be much quicker, with birds staging at sites for less time than in fall. These sites are generally distributed throughout the migration path, which, in the NP&PR, includes northeastern Alberta, central and southern Saskatchewan, northeastern Montana, central and western North Dakota, and west-central South Dakota.

***Habitat requirements*:** Roosting sites for migrating cranes are typically freshwater, inland, shallow wetlands, usually <4 ha in size (>40% of wetlands <0.5 ha), and <1 km from foraging sites. In spring, temporary and seasonal wetlands are used most frequently for roosting, whereas semi-permanent and permanent wetlands were used during fall. For feeding, birds use croplands at upland sites, generally close to roost sites. Sites that are further from potential disturbance (buildings) or threats (powerlines) are preferred.

***Global distribution*:** Several disjunct migratory and resident populations exist throughout North America. The largest population, consisting of roughly 194 birds, breeds in Wood Buffalo National Park, Northwest Territories, and winters at Aransas National Wildlife Refuge, Texas. A new, migratory population was established in 2001, which migrates between Necedah National Wildlife Refuge, Wisconsin, and Chassahowitzka National Wildlife Refuge, Florida. This population totaled 36 in 2003. A non-migratory population was established on the Kissimmee Prairie of Florida in 1993; this population totaled 84 birds in 2003.

***Issues in NP&PR*:**

- Whooping cranes tolerate little human disturbance.
- Incidental shooting mortality is unknown, but likely minor.
- Wetland drainage was a large concern in the past, but is of less significance now.
- Most foraging and roost sites are under private ownership and subject to changes in land use.
- Whooping Cranes may be exposed to avian cholera that is often associated with large concentrations of Snow Geese, which may occur in same areas.
- Climate change may affect hydrologic regimes especially along migratory path.

***Existing action*:**

- Federally listed as endangered under U.S. Endangered Species Act and Canadian COSEWIC (Northwest Territories and Alberta). Also state listed as endangered in Montana, North Dakota, and South Dakota, and provincially listed as at risk in Alberta.

- Historical and current observations are well documented in sightings database.
- 1996-1997 Contingency Plan : Federal-State Cooperative Protection of Whooping Cranes.
- National Recovery Plan for the Whooping Crane developed by the Canadian Whooping Crane Recovery Team, 1994 (**www.cws-scf.ec.gc.ca/es/whocra_e.html**).

***Action needed*:**

- Protect migration staging and stopover sites.

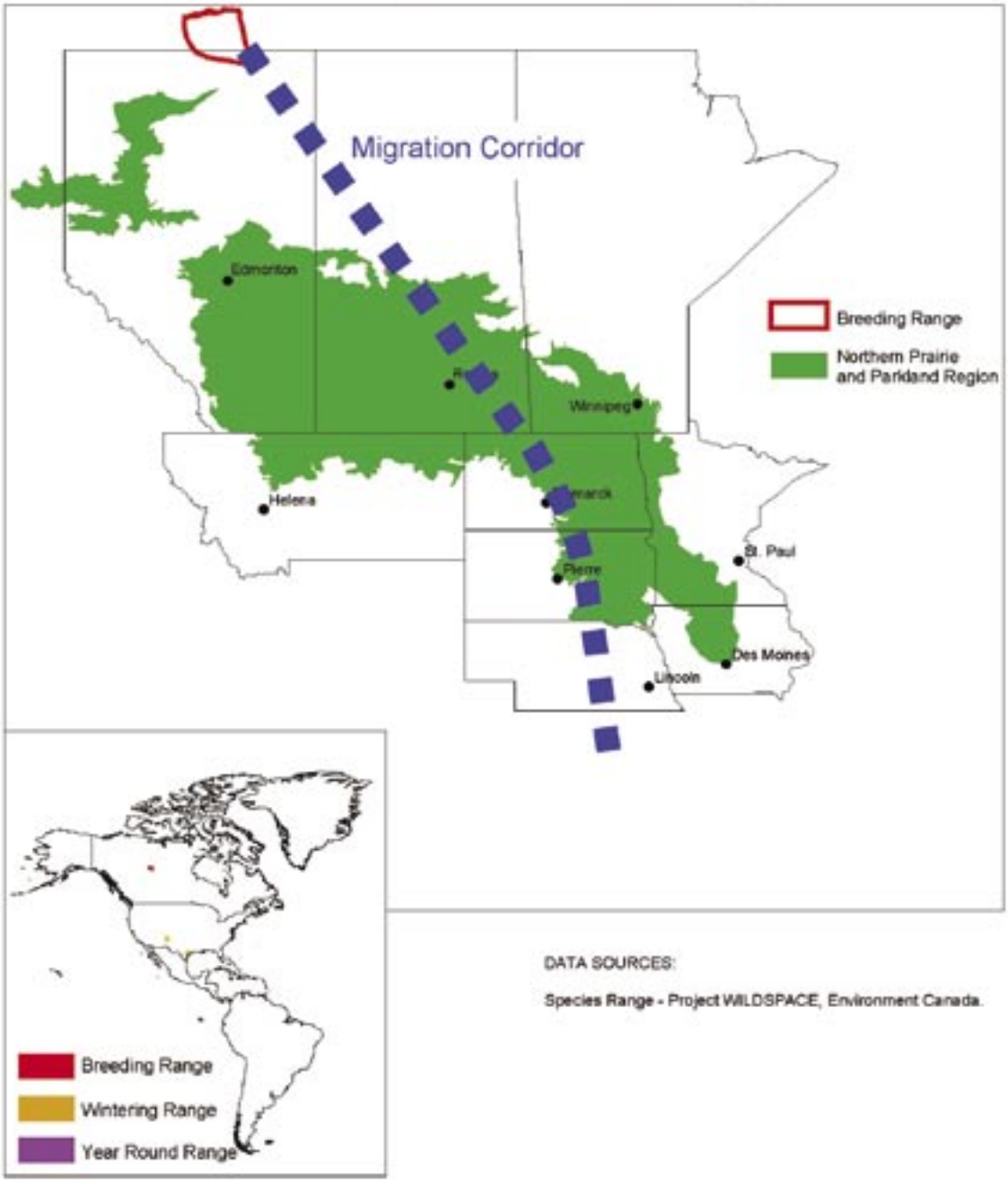
***Primary regional contacts*:** Brian Johns, CWS; Gregg Knutsen, USFWS; Mike Johnson, North Dakota Game & Fish.

References:

Anonymous. 1997. 1996-1997 Contingency Plan Federal-State Cooperative Protection of Whooping Cranes. Federal -state committee unpublished report. 32 pages.

Lewis J. C. 1995. Whooping Crane. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 153. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Whooping Crane Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Franklin's Gull – *Larus pipixcan*
Mouette a de Franklin – Gaviota de Franklin

***Status Summary**:*

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **High Concern**

Population trend	[3]
Relative abundance	[1-2]
Threats to breeding	[4]
Threats to non-breeding	[3]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[5]

Continental and BCR11 populations	315,608 - 990,864;	183,600 - 689,400
Population trend in BCR11	7.09%/yr, p = 0.24	
Population trend in North America	11.2%/yr, p = 0.10	
Abundance status in BCR11	Locally common	
BCR11 % of continental population	~67%	

Occurrence in NP&PR: Colonial breeder and fall and spring migrant throughout most of the region. Breeding range includes Alberta, Saskatchewan, Manitoba, Montana, North Dakota, western Minnesota, northeast South Dakota, and northwest Iowa. Some colony sites may be used regularly year after year, but birds will frequently select a new site. Colonies may range from 100s to 10,000s of birds.

Habitat requirements: Breeding colonies occur in extensive prairie marshes that provide cattail, bulrush, or other, preferably sparse, emergent vegetation. Typically nests on floating mats of vegetation, muskrat houses, or debris. Reported water depths at nests vary (e.g., 15 – 180 cm); however, rapid increases in water levels during the breeding season may negatively impact egg and chick survival. During breeding, activities mainly focused within 30 km of colony. Generally forages over water surface in flooded areas and in agricultural fields and prairies for flying insects, grains/seeds, and other available plant and animal matter (e.g., midges, dragonfly nymphs, earthworms, grasshoppers, and grubs).

Global distribution: In addition to NP&PR, breeding range includes northern Utah, western Wyoming, Idaho, Oregon, and western Montana. Wintering range is largely along Pacific Coast of South America from central Peru to northern Chile. Small populations occur in southern California, south-central U.S., Central America, Galapagos Islands, and other parts of South America.

Issues in NP&PR:

- Very high continental responsibility for conservation of this species.
- Botulism outbreaks on some lakes in the region can cause high mortality.
- Uncertain whether use of certain agricultural pesticides is having detrimental effects on this species, which commonly feeds in agricultural fields.
- Potential for negative interaction between large congregations of Franklin's Gull and human development such as airports.

Existing action:

- Listed as a species of special concern in Minnesota.
- Preservation of large colonies on National Wildlife Refuges in U.S.

Research needs:

- Determine influence of human development on colony size, location, and production.
- Determine influence of other gull species on Franklin's Gull ecology.
- Develop better understanding of colony dynamics, including determinants of colony location and consistency of use of individual sites.

- Investigate interactions between avian botulism and Franklin's Gull. Blue-green algae poisoning of Franklin's Gulls may be a key trigger for botulism outbreak. Outbreaks may be a significant mortality factor.

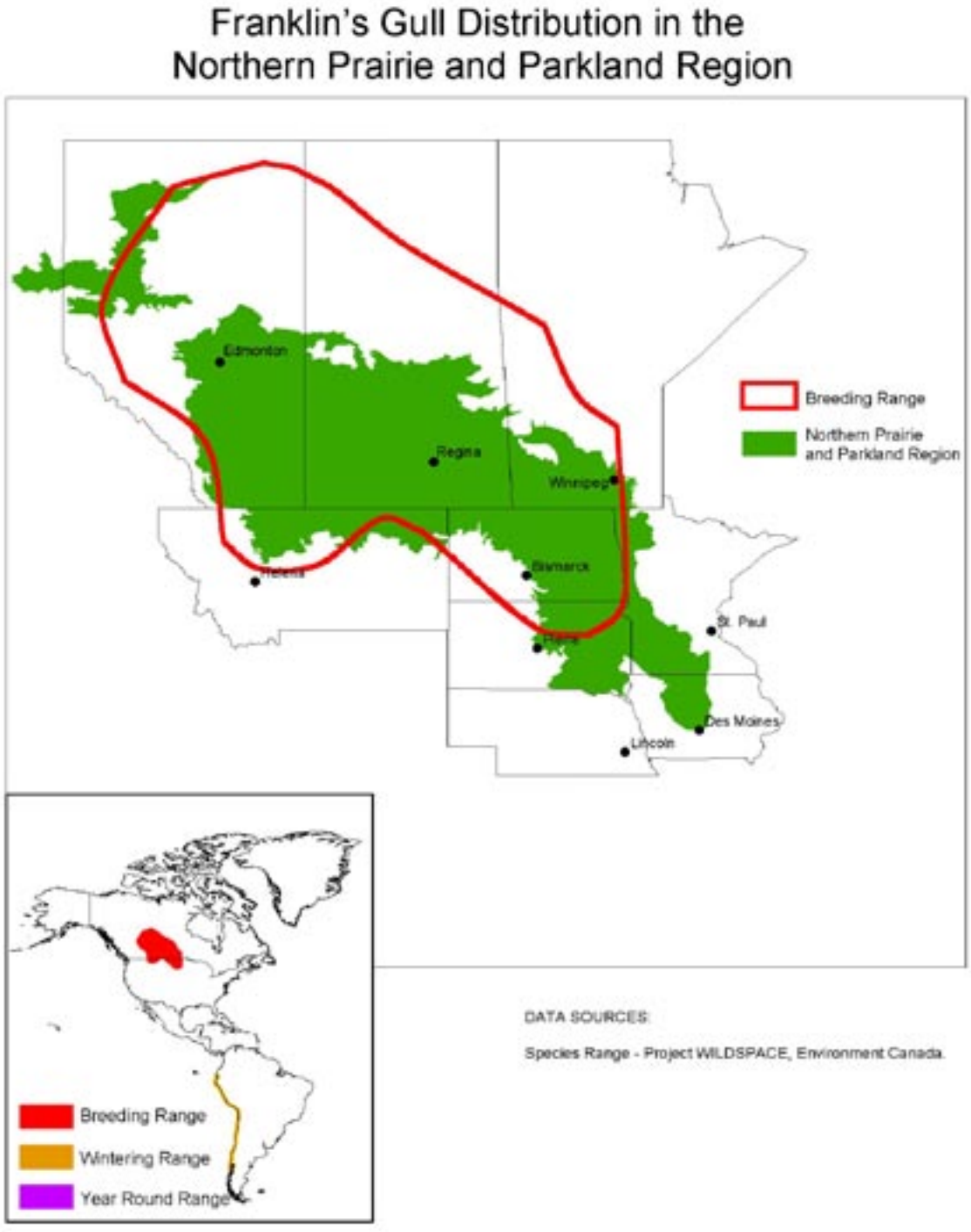
Action needed:

- More accurately estimate population size, distribution, and trend.
- Identify and target high priority landscapes and habitats, including staging areas, for conservation action.

***Primary regional contacts**:* Joel Brice, Delta Waterfowl; Gary Huschle, USFWS.

Reference:

Burger, J. and M. Gochfeld. 1994. Franklin's Gull. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 116. The Academy of Natural Sciences, Philadelphia, Pennsylvania; The American Ornithologists' Union, Washington, D.C.



Bonaparte's Gull - *Larus philadelphia*
Mouette de Bonaparte - Gaviota de Bonaparte

Status Summary:

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **Low Risk**

Population trend	[?]
Relative abundance	[3]
Threats to breeding	[3]
Threats to non-breeding	[3]
Breeding distribution	[1]
Non-breeding distribution	[2]
Area importance of BCR11	[1]

Continental and BCR11 populations:	>175,000	Unknown
Population trend in BCR11:	Unknown	
Population trend in North America:	Unknown	
Abundance status in BCR11:	Rare and occasional breeder	
BCR11 % of continental population:	Unknown	

Occurrence in NP&PR: Breeds only in the northernmost parkland portions of the NP&PR in central Alberta, central Saskatchewan, and west-central Manitoba. A common migrant in the region. In spring, migrating flocks tend to be small and remain in the region only briefly. In fall, numbers persist longer and flock sizes are larger, numbering as many as 500 individuals. There is reportedly a possible migratory divide between eastern and western portions of the population in Alberta or Saskatchewan; birds west of this divide migrate toward the Pacific, and birds east of the divide migrate towards the Great Lakes. Occurs as a vagrant and is rare across the region during winter.

Habitat requirements: A habitat specialist, Bonaparte's Gull is the only tree nesting gull species in the NP&PR. Requires open coniferous woodland near bogs, ponds and lakes. Usually breeds singly, with one breeding pair occupying a single lake. May breed in small, loose colonies of 4-20 individuals in bogs at the edges of lakes; however, nests are generally >200m apart. In southern portions of the breeding range may nest in bulrush marshes, mudflats, and spruce shelterbelts. Nests are typically composed of twigs, mosses, and lichens. Nest linings usually consist of bark, moss, reeds, or grass, and are placed 2-7 m above ground. On migration, birds congregate on large lakes and rivers, estuaries, marshes, ponds, and sewage lagoons.

Global distribution: Found only in North America. Breeds in western and central Alaska, and in the coniferous belt of western and central Canada. Winters from southern British Columbia and coastal Maine, south to northern Mexico, Bermuda, Cuba and Haiti. Also winters in sizable numbers in both Lake Ontario and Lake Erie. Reported frequently as a vagrant in the coastal palearctic, Hawaiian islands, Greenland, and Japan. Site records from Yucatan Peninsula and Costa Rica.

Issues in NP&PR:

- Timber harvest may impact breeding habitats in southern portions of boreal forest.
- Due to insectivorous feeding habitats of Bonaparte's Gull, pesticides may be a potential contaminant.

Existing action:

- None known.

Research needs:

- Develop better understanding of general breeding biology, habitat requirements, and foraging ecology.
- Investigate sensitivity of Bonaparte's Gull to human disturbance on breeding grounds and effect of forest harvest/fragmentation on breeding success and fidelity to breeding sites.
- Investigate breeding success of both single and colonial nesting pairs for purposes of management and/or protection.
- Determine if restored or managed wetlands provide suitable habitat.

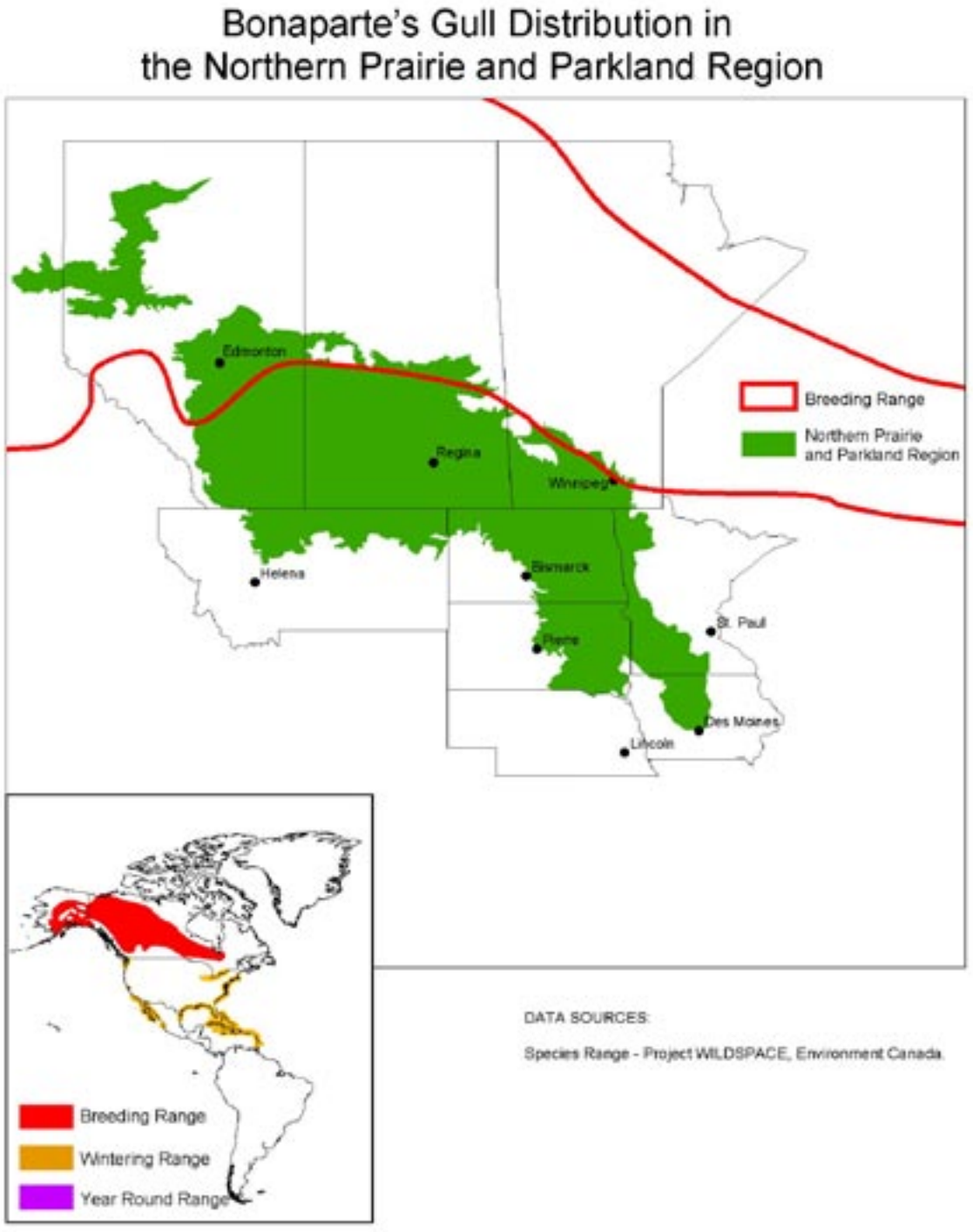
Action needed:

- More accurately estimate population size, distribution, and trend.

Primary regional contacts: None known.

Reference:

J. Burger and M. Gochfield. 2002. Bonaparte's Gull. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 634. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Ring-billed Gull - *Larus delawarensis*
Goéland à bec cerclé - Apipizca pinta/Gaviota Piquianillada

***Status Summary*:**

Continental conservation priority: Not At Risk
Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[1]
Threats to breeding	[1]
Threats to non-breeding	[1]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[2-3]

Global and BCR11 populations:	>3,000,000; >140,000
Population trend in BCR11:	[2.07%/yr., p = 0.29]
Population trend in North America:	[2.2%/yr. (p = 0.04)]
Abundance status in BCR11:	Common to abundant
BCR11 % of continental population:	> 5%

***Occurrence in NP&PR*:** Common throughout most of the region. Breeds in colonies up to approximately 10,000 pairs. Breeds throughout northern portions of region extending south to northeastern South Dakota and east to west-central Minnesota. Abundant in southeastern Alberta, central Saskatchewan, central North Dakota, and west-central Manitoba. Occurs throughout the region during both spring and fall migration, sometimes in large numbers. In winter, uncommon in southernmost portions of the region and sporadic elsewhere; winter distribution highly dependent on weather.

***Habitat requirements*:** Nests on ground, usually close to water. Prefers islands with flat, elevated terrain (2-30 m) and a variety of sparse or woody vegetation. Nests typically consist of a mound lined with grasses, mosses, weeds, or bark strips. In the region, breeding colonies are typically located on islands in both small and large water bodies. Nests occasionally on causeways or peninsulas in large freshwater lakes, but these are often subject to heavy predation; rarely nests on islands in rivers. Forages along shorelines and islands; commonly frequents garbage dumps, fields (especially newly ploughed ones), parks, playgrounds and parking lots.

***Global distribution*:** Nearctic. Breeding range extends from 39-61°N, and 53-124°W, in North America. Breeding colonies in Great Lakes region and eastern portions of range are much larger (some >75,000 breeding pairs) than those in central and western portions. Winters on Pacific, Atlantic, and Gulf coasts of North America. Also winters in the Colorado and Mississippi river basins, Great Salt Lake, and Great Lakes regions. Occurs casually during the non-breeding season in Lesser Antilles, and as a vagrant in most coastal areas of the palearctic.

***Issues in NP&PR*:**

- Considered nuisance species in many jurisdictions due to predation of other species and association with human developments.
- Out-competes other, smaller species, such as Common Tern, for breeding sites in colonies; may be responsible for declines in this species at some colonies.
- Potential health concern from droppings at roosting/loafing sites located near human habitation such as beaches, playgrounds, parks.
- In some cases, droppings from large colonies interrupt native plant succession due to increased nutrient inputs.
- Hazards associated with large concentrations in open areas of human developments such as airport runways.

***Existing action*:**

- Extensive and ongoing colony censuses in many jurisdictions.

Research needs:

- Determine extent of impact on other species.

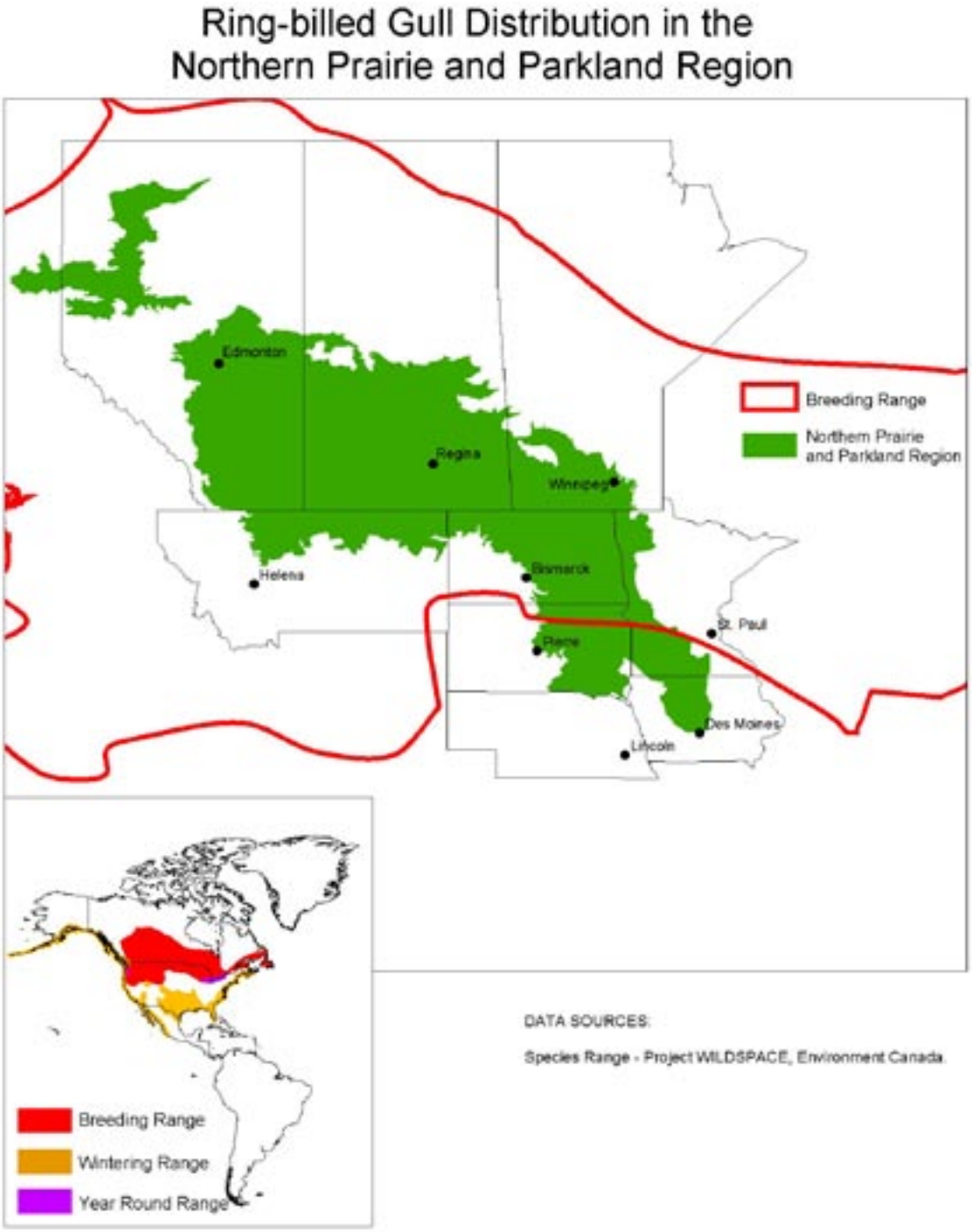
***Action needed*:**

- Monitor existing and historic colonies to provide population estimates and understand shifts in site use over time and in relation to environmental conditions.
- Link regional monitoring to a continental monitoring scheme to estimate continental populations and trends.
- Possible control measures, although further study on competition with and predation of other target species is necessary.

***Primary regional contacts*:** None known.

Reference:

Ryder, J. P. 1993. Ring-billed Gull. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 33. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



California Gull – *Larus californicus*
Goeland de Californie – Gaviota Californiana

***Status Summary**:*

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **Low Risk**

Population trend	[2]
Relative abundance	[2]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[2]
Non-breeding distribution	[3]
Area importance of BCR11	[4]

Continental and BCR11 populations	> 414,000; ~122,000
Population trend in BCR11	[5.35%/yr, p = 0.05]
Population trend in North America	[-0.2%/yr, p = 0.92]
Abundance status in BCR11	Common
BCR11 % of continental population	~ 30%

Occurrence in NP&PR: Colonial breeder in Alberta, Saskatchewan, Manitoba, Montana, North Dakota, and South Dakota; casual in Minnesota. Greatest abundance in northwest portion of region. Populations shift depending on water availability. Colonies can exceed 20,000 individuals.

Habitat requirements: Associated with large, often saline, lakes and wetlands. Typically nests on islands; colony locations often change with varying water levels. Reservoirs have created additional habitat and nest sites. Forages on insects, aquatic invertebrates, fish, and carrion in wetlands, agricultural fields, lakeshores, landfills, and urban areas.

Global distribution: Breeds from southern Northwest Territories, Saskatchewan, Manitoba, south to east-central South Dakota, central Montana, northwestern Wyoming, eastern Idaho, northwestern Utah, northwestern Nevada, eastern California, and southwestern Washington. Largest breeding colonies occur around Great Salt Lake, Utah. Winters from southern Washington, eastern Idaho, south along Pacific coast to southern Baja California, northwestern Mexico; casual on Hawaiian islands.

Issues in NP&PR:

- Considered nuisance species in some areas due to predation of other species and increasing colony sizes, likely due to availability of human-associated food.
- Localized depredation of bird nests and young, including endangered Piping Plover.

***Existing action**:*

- Irregular surveys in some provinces and states determine occupancy and status of some colonies, population estimates and productivity.

Research needs:

- Determine impacts on other species in proximity to large colonies.

Action needed:

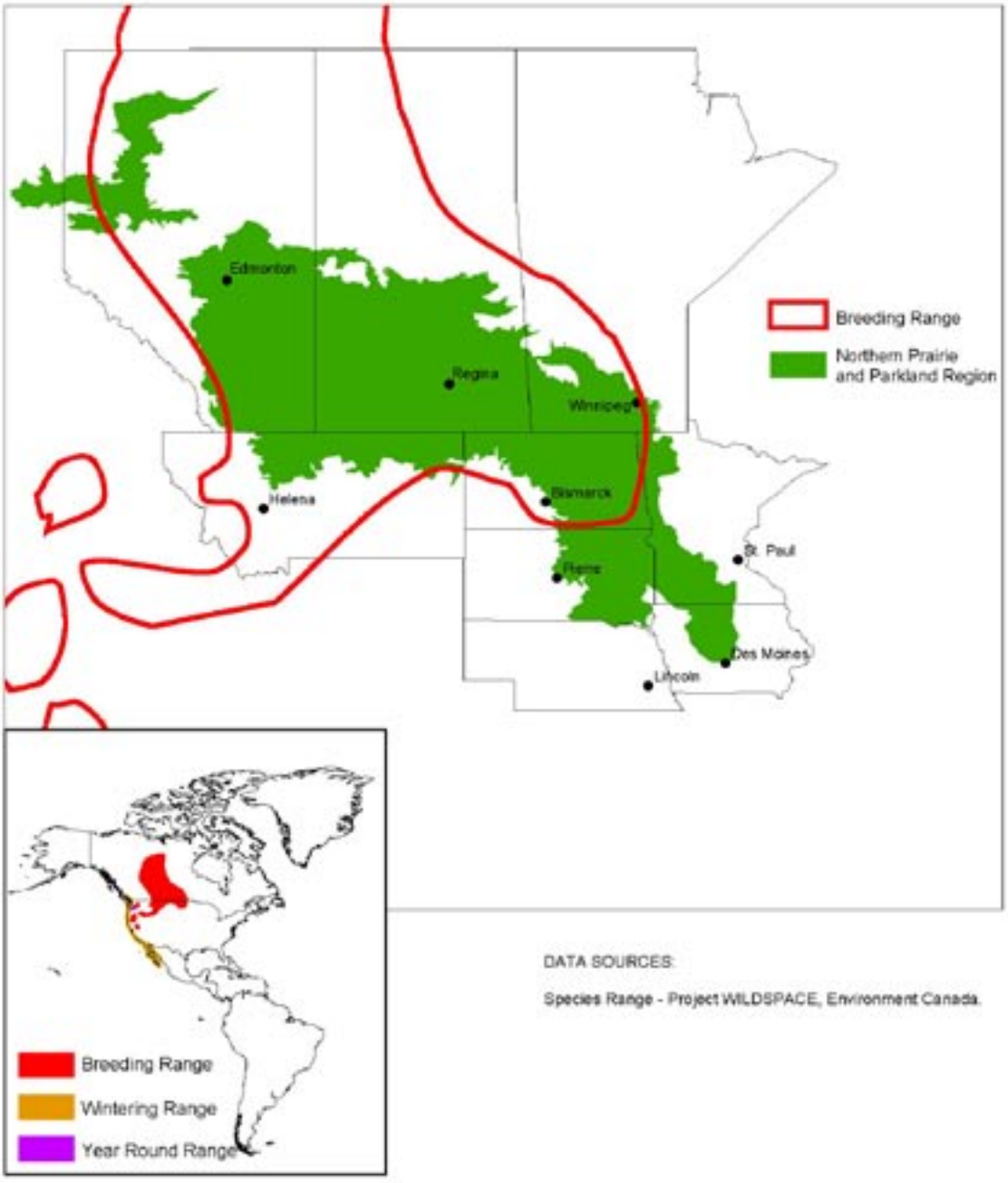
- Monitor existing and historic colonies to provide population estimates and understand shifts in site use over time and in relation to environmental conditions.
- Link regional monitoring to a continental monitoring scheme to estimate continental population estimates and trends over the long term.

***Primary regional contacts**:* None known.

Reference:

Winkler, D. W. 1996. California Gull (*Larus californicus*). *In* A. Poole and F. Gill, eds. The Birds of North America, No. 259. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

California Gull Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Herring Gull - *Larus argentatus*
Goéland argenté - Gaviota plateada

***Status Summary*:**

Continental conservation priority: Low concern
Regional conservation vulnerability: **Low Risk**

Population trend	[3]
Relative abundance	[2]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[1]
Non-breeding distribution	[1]
Area importance of BCR11	[2]

Continental and BCR11 populations:	>246,000; <5,000?
Population trend in BCR11:	[-6.4%/yr., p = 0.0001]
Population trend in North America:	[-3.4%/yr. P < 0.01]
Abundance status in BCR11:	Uncommon but locally abundant
BCR11 % of continental population:	~2%?

***Occurrence in NP&PR*:** Uncommon. Breeds primarily in northern and eastern portions of the region. Rare and transient breeder in the grasslands. Larger nesting concentrations observed in south-central Alberta, central Saskatchewan, and west-central Manitoba. Breeds in small numbers in northeastern Montana, northern North Dakota, and western Minnesota. More frequent as a spring and fall migrant. Uncommon winter resident in southernmost portions of region. BBS data not considered reliable. Populations believed stable overall, with possible decrease from high point in 1960s and minor changes in range.

***Habitat requirements*:** Prefers to nest on low, sparsely vegetated (< 50%), relatively small islands in larger lakes within the region. Also prefers dry, well-drained substrate (rock or sand) for nesting. Highest breeding success in vegetated areas with adequate cover, also prefers areas inaccessible to terrestrial predators and free from wind. Many nest solitarily on offshore rocks, rooftops, and rocky islets. Considered a facultative colonial nesting species. Forages in intertidal zones, sandy beaches, mudflats, refuse dumps, and ploughed fields.

***Global distribution*:** Circumpolar breeding distribution. Occurs on Iceland, coasts of Europe, and northern Africa. In Asia occurs throughout the north and on inland lakes. In North America, year-round resident on Great Lakes, and Atlantic coast from Newfoundland to North Carolina. Breeds from southern Alaskan coast inland to Hudson's Bay, and south to North Carolina coast. Also breeds in north-central interior of British Columbia. Winters on Pacific coast from the Aleutians south to Panama, on the Atlantic coast from Newfoundland to the West Indies, on the Great Lakes, and occasional to frequent on Hawaiian Islands.

***Issues in NP&PR*:**

- Considered nuisance species in some jurisdictions due to association with human development and predation of other species. However, may be less of a problem than in other regions due to small population in NP&PR and apparent population declines.
- Pesticide contamination and oil pollution in other regions problematic in occasional, direct adult mortality and indirect losses through reduced reproductive success and juvenile survivorship. However, impact of both in NP&PR not known.
- Population control measures (shooting, clubbing of adults and nests, oiling of nests) used in some regions, including NP&PR.

***Existing action*:**

- Ongoing colony censuses in many jurisdictions.

***Action needed*:**

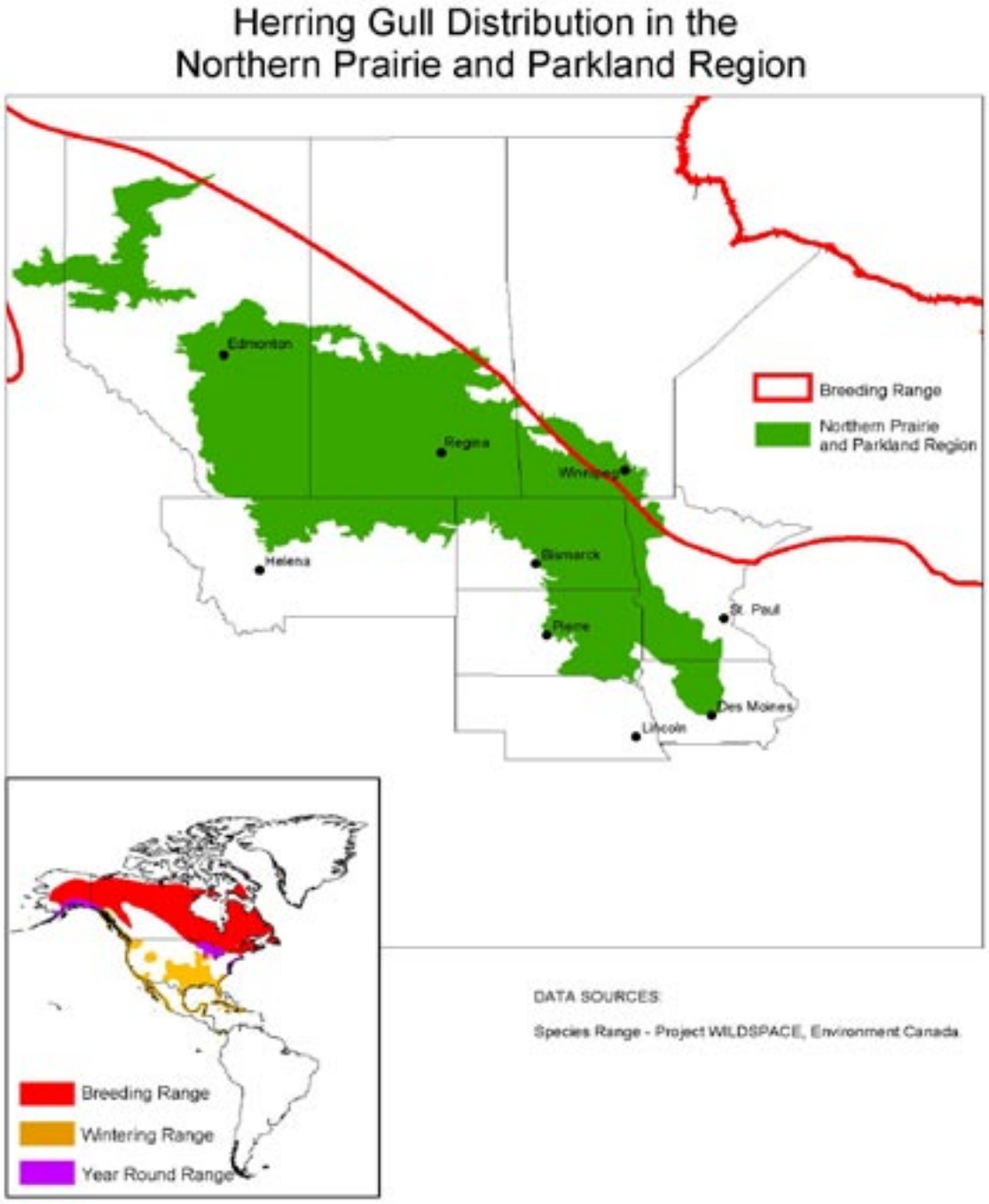
- Monitor existing and historic colonies to provide population estimates and understand shifts in site use over time and in relation to environmental conditions.

- Link to a continental monitoring scheme to estimate continental population estimates and trends over the long term.

Primary regional contacts: None known.

Reference:

Pierotti, R. J., and T. P. Good. 1994. Herring Gull. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 124. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Caspian Tern - *Sterna caspia*
Sterne Caspienne - Charrán caspia/Pagaza Piquiroja/Golondrina-marina Caspica

***Status Summary*:**

Continental conservation priority: Low concern
Regional conservation vulnerability: **Moderate Concern**

Population trend	[3]
Relative abundance	[2]
Threats to breeding	[5]
Threats to non-breeding	[2]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[1]

Continental and BCR11 populations:	~70,000; ~400-500?
Population trend in BCR11:	Unknown
Population trend in North America:	[4.4%/yr., p = 0.10]
Abundance status in BCR11:	Rare; few scattered colonies
BCR11 % of continental population:	< 1%

***Occurrence in NP&PR*:** Uncommon breeder across the region as isolated pairs and in small colonies. In Alberta, confirmed breeding at six locations, but suspected at several other sites. In Saskatchewan, two confirmed breeding locations (one historical/one recent); there are no confirmed breeding sites in the Prairie Pothole region of Manitoba. Uncommon breeder in north-central Minnesota, eastern Montana, and central North Dakota.

***Habitat requirements*:** Prefers sandy islands (often small) on larger lakes, or on sandy, muddy or pebbly shores. Nests found among driftwood and debris on low, flat, sandy or rocky islands with sparse vegetation. Some of the largest North American colonies are now associated with artificial habitats. On migration, occurs on large rivers, marshes and freshwater lakes.

***Global distribution*:** Breeds in scattered locations in North America, Europe, Asia, Africa and the Australian region. In North America, colonies are concentrated in 6 main areas: 1) Pacific Coast, 2) central Canada, 3) west-central interior U. S., 4) Gulf Coast, 5) Atlantic Coast, and 6) the Great Lakes. The North American populations winter along the southern Atlantic and Pacific coasts, and the Gulf Coast as far south as Columbia and Venezuela; rarely in the Caribbean, and casual in Hawaii.

***Issues in NP&PR*:**

- Predation of nests and adults at nesting colonies by avian and mammalian predators.
- Susceptible to contamination from pesticides, reducing productivity and increasing juvenile mortality.
- Very susceptible to human disturbance including censusing, banding, and nest monitoring, especially during early incubation period.
- Interspecific competition, mainly by gulls. Earlier nesting by gulls may force subordinate terns into sub-optimal nesting habitat, resulting in higher nest failure.
- Competition for commercial fisheries stocks; however, tern population increases may be a result of increases in available prey.

***Existing action*:**

- Status assessment and conservation recommendations compiled by Shuford and Craig (2002).
- Irregular surveys in some provinces and states to determine occupancy/status of some colonies and estimate populations and productivity.
- Listed as sensitive in Alberta.

***Action needed*:**

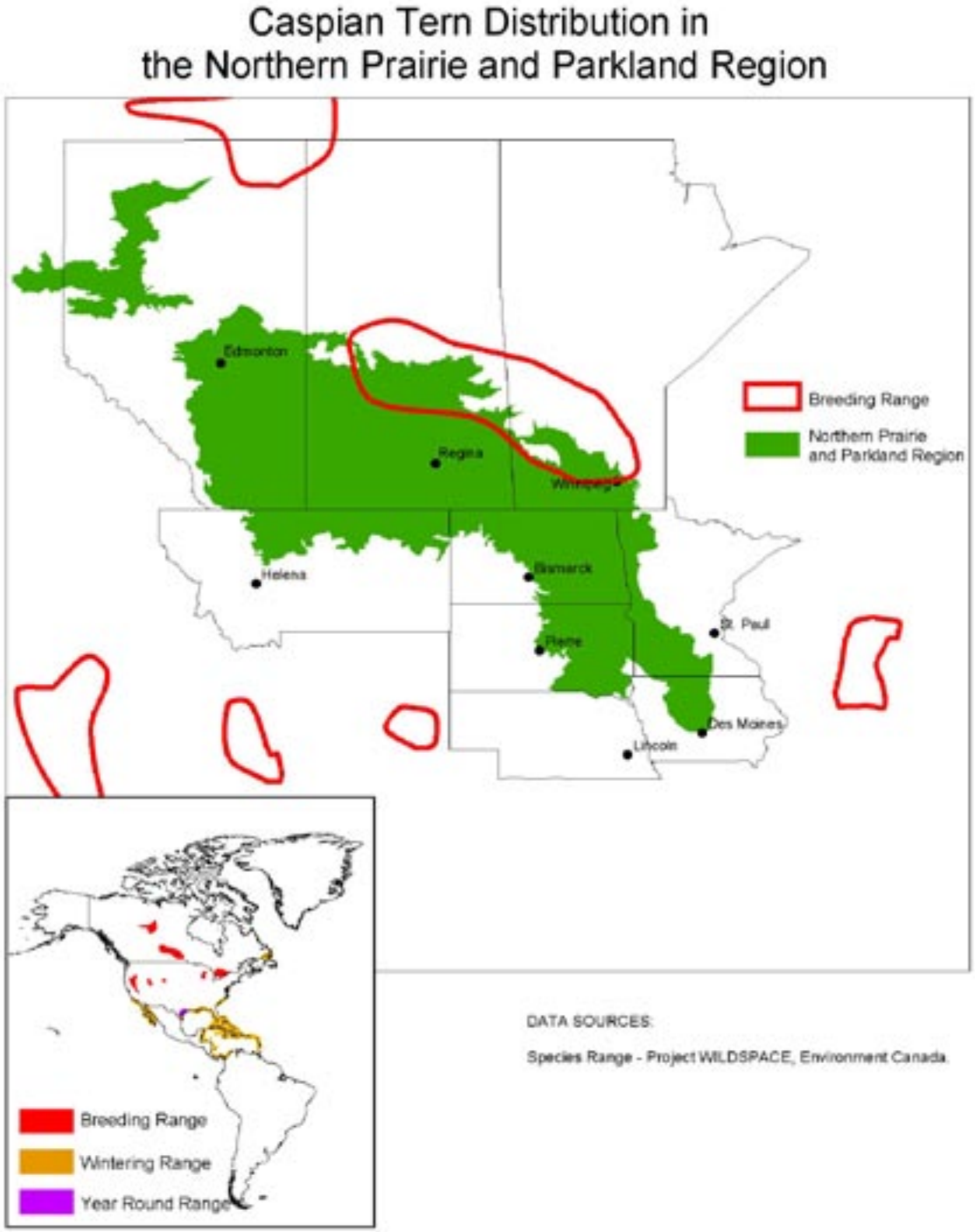
- Specific actions and needs for the NP&PR have not been identified; Shuford and Craig (2002) offered specific recommendations for monitoring, habitat management and protection, research, outreach, and education.

***Primary regional contacts*:** None known.

References:

Cuthbert, F. J., and L. R. Wires. 1999. Caspian Tern. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 403. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Shuford, W. D., and D. P. Craig. 2002. Status assessment and conservation recommendations for the Caspian tern (*Sterna caspia*) in North America. U.S. Department of the Interior, Fish and Wildlife Service, Portland, OR.



Common Tern – *Sterna hirundo*
Sterne commune – Charran Común/Golondrina-marina Común

***Status Summary**:*

Continental conservation priority: Low concern
Regional conservation vulnerability: **Moderate Concern**

Population trend	[3]
Relative abundance	[2]
Threats to breeding	[5]
Threats to non-breeding	[4]
Breeding distribution	[2]
Non-breeding distribution	[1]
Area importance of BCR11	[3]

Continental and BCR11 populations	300,000; Unknown
Population trend in BCR11	[-1.87%/yr, p = 0.75]
Population trend in North America	[-6.7%/yr, p = 0.04] BBS data show a -67.0% change (p < 0.10) from 1984-1993.
Abundance status in BCR11	Locally common.
BCR11 % of continental population	10-24%

Occurrence in NP&PR: Largely colonial with occasional solitary nesting. Breeds locally in northeastern South Dakota, northwestern Minnesota and central and eastern North Dakota. Also breeds throughout prairie and parkland regions of NP&PR in Canada wherever permanent waters occur, becoming more abundant in the northern portion of the prairie region.

Habitat requirements: Feeds on both freshwater and marine fish and crustaceans. Avoids tall vegetation at breeding sites, nesting on bare rock, shingle, sand, bare ground or short grass, occasionally on floating mats of dead vegetation, usually on islands, sand spits, gravel bars. Will fly up to 50 km between foraging and roosting areas. Will breed with other colonial waterbirds, but prefers peripheral sites, often on barren sand or gravel bars unused by other larids.

Global distribution: Breeds over wide spectrum of habitats both along coasts and on inland fresh waters throughout northern Eurasia and North America south of the arctic in a discontinuous pattern south along coastlines to northern South America and West Africa. Winters from Baja California and South Carolina to Peru and northern Argentina. Casual in Hawaii and western Palearctic.

Issues in NP&PR:

- Water management important for maintaining island nesting habitat.
- Susceptible to predation and/or competition from gulls, primarily Ring-billed Gull.
- Sensitive to disturbance from boaters and other recreational activities that can lead to reduced productivity or nest abandonment.

Existing action:

- Listed as threatened in Minnesota.
- Infrequent and irregular surveys of some colonies across the NP&PR.

Action needed:

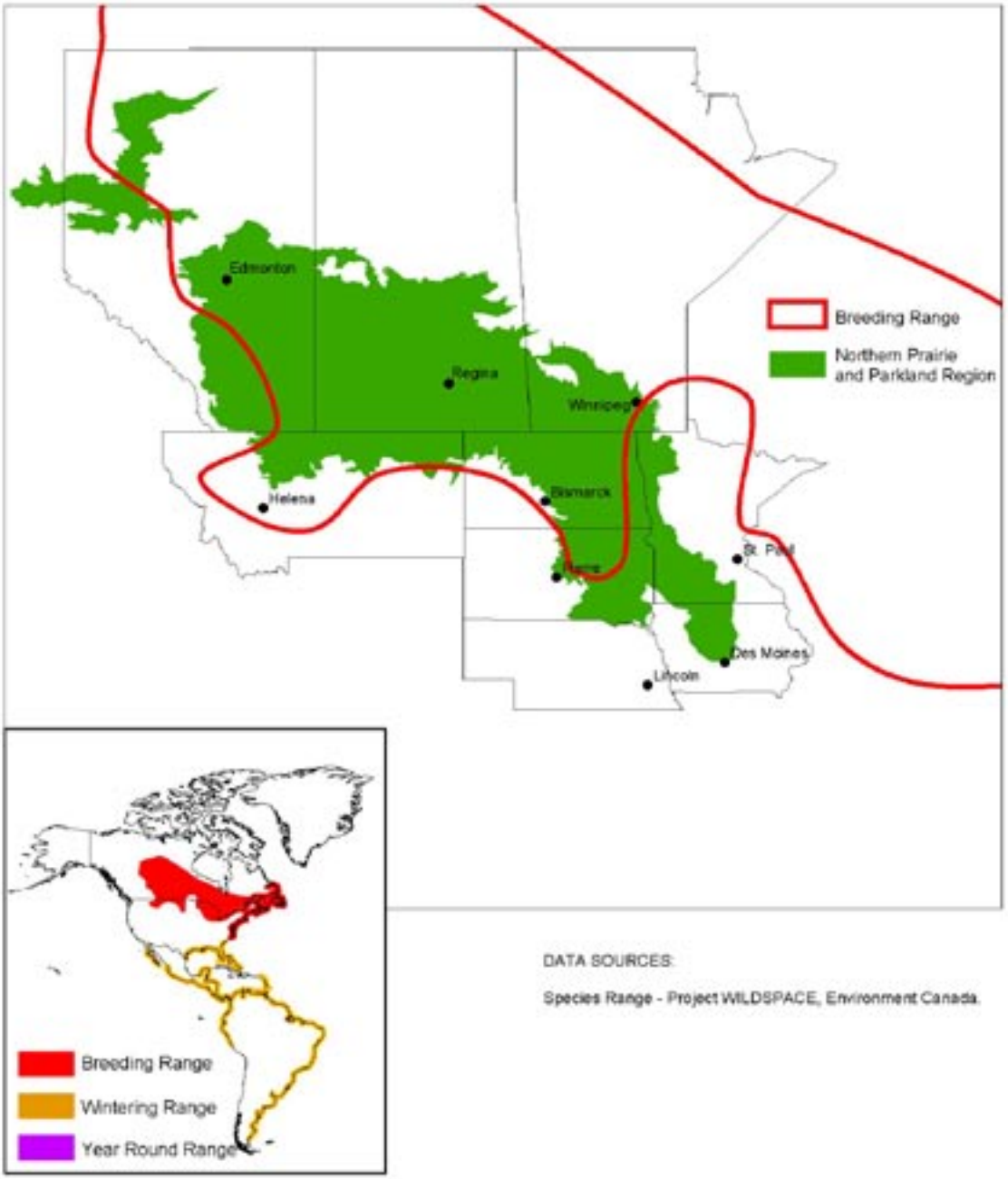
- More accurately estimate population distribution, size, and trend throughout the region.
- Assess accuracy of Breeding Bird Survey data.

***Primary regional contacts**:* None known.

Reference:

Nisbett, I. C. T. 2002. Common Tern. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 595. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Common Tern Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

Forster's Tern - *Sterna forsteri*
Sterne de Forster - Golondrina-marina de Forster

***Status Summary*:**

Continental conservation priority: Moderate Concern
Regional conservation vulnerability: **Low Risk**

Population trend	[1]
Relative abundance	[3]
Threats to breeding	[3]
Threats to non-breeding	[2]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[2]

Continental and BCR11 populations	37,000 - 40,000;	~3,175
Population trend in BCR11	[37.13%/yr, p = 0.04]	
Population trend in North America	[0.4%/yr, p = 0.71]	
Abundance status in BCR11	Uncommon	
BCR11 % of continental population	8-10%?	

***Occurrence in NP&PR*:** Uncommon and local throughout most of the region, except very local or absent in much of southern Alberta and southwestern Saskatchewan. Most abundant in Manitoba on the eastern border of the NP&PR along the shores of lakes Manitoba, Winnipeg and Winnipegosis. Scarce migrant in portions of the NP&PR south of breeding range, perhaps either overlooked or migrates through breeding range.

***Habitat requirements*:** Nests colonially in both fresh and saltwater marshes. Often nests in association with grebes, American Coots, gulls, terns and marsh-nesting passerines including Yellow-headed Blackbirds. The latter may help in nest success by driving away predators. Nests are located on mats of drifted vegetation, low islands or muskrat houses. During breeding season, forages near nesting areas; during winter feeds on inshore waters.

***Global distribution*:** Nearctic endemic. Two discrete breeding populations: 1) locally in the interior from extreme southern British Columbia, the central Prairie Provinces, western and southern Ontario, south to northern California, central Kansas and northern Indiana. 2) locally on the Atlantic Coast from New Jersey to North Carolina, and the Gulf Coast in Texas and Louisiana. Winters on the Pacific Coast from central California to Guatemala, the Atlantic coast from Virginia south along the Gulf Coast to the Greater Antilles.

***Issues in NP&PR*:**

- Current distribution and population estimates for the region are lacking.
- Water management may be an issue for the maintenance/enhancement of colonial breeding sites.

***Existing action*:**

- Listed as species of special concern in Minnesota.

***Action needed*:**

- Monitor existing and historic colonies to provide population estimates and shifts in site use over time and environmental conditions.
- Link surveys to a continental monitoring scheme to estimate continental population estimates and trends over the long term.
- Identify and protect key sites or wetland habitats.

Primary regional contacts: None known

Reference:

McNicholl, M. K., P. E. Lowther, and J. A. Hall. 2001. Forster's Tern. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 595. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Least Tern – *Sterna antillarum*
Petite Sterne – Charran minimo

***Status Summary**:*

Continental conservation priority: High concern
Regional conservation vulnerability: **Listed**

Population trend	[4]
Relative abundance	[2]
Threats to breeding	[5]
Threats to non-breeding	[4]
Breeding distribution	[3]
Non-breeding distribution	[2]
Area importance of BCR11	[1-2]

Continental and BCR11 populations	60,000 - 100,000;	~680?
Population trend in BCR11	[-0.69%/yr, p = 0.77]	
Population trend in North America	[0.2%/yr, p = 0.95]	
Abundance status in BCR11	Rare	
BCR11 % of continental population	< 2%	

Occurrence in NP&PR: Colonial/semicolonial nester in Montana, North Dakota, South Dakota, and Iowa. Casual in Saskatchewan and Minnesota. Distribution limited primarily to large river systems and nearby water bodies. Federally listed as endangered in United States.

Habitat requirements: Nests on sand bars, beaches, dry mudflats, unvegetated islands, and barren ground along major rivers, reservoirs, lakes, and alkali wetlands. In some areas, nesting habitats have changed with human-caused loss of natural habitat and creation of other substrates such as dredge spoil, agricultural fields, gravel rooftops, and gravel pits. Requires foraging areas with abundant small-bodied fish, as well as insects and crustaceans.

Global distribution: Breeding range widely distributed across North America, Central America, and northern South America, as well as many Caribbean islands. Winters in marine coastal areas from U.S. Gulf Coast south to Argentina. One possible record from England.

Issues in NP&PR:

- Nest sites associated with high human disturbance often have low nest success.
- Populations in peril due to loss of habitat from human recreation, residential development, and alteration of natural river flows. Holding flood water in reservoirs prevents scouring of sandbars necessary for nesting; untimely water release later in the year can flood nests.
- Bio-accumulation of contaminants in fish may also impact populations, but extent of problem poorly known.

***Existing action**:*

- Federally listed as endangered under U.S. Endangered Species Act and state listed in Montana, North Dakota, South Dakota, and Iowa.
- Creation of islands and clearing of vegetation helpful in providing nesting habitat.
- Management and protection of nesting areas helpful, including exclusion of predators from nest sites.
- Recovery Plan produced for the Interior Population.

Action needed:

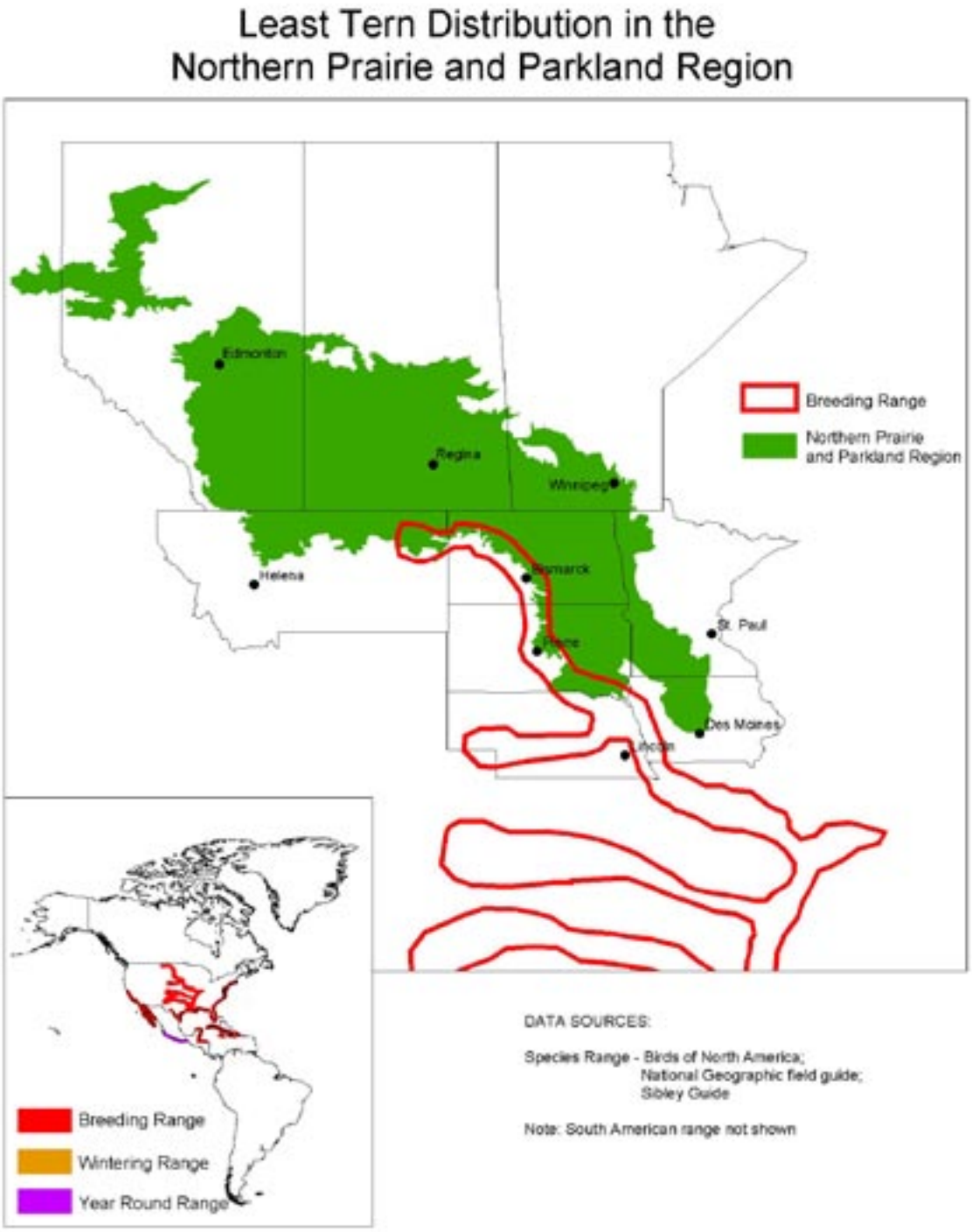
- Continue to implement the Recovery Plan to protect, enhance and increase Interior Least Tern populations.

***Primary regional contacts**:* Nell McPhillips, U.S. Bureau of Reclamation; Casey Kruse, U.S. Army Corps of Engineers.

References:

Sidle, J. G. and W. F. Harrison. 1990. Recovery Plan for the Interior Population of the Least Tern (*Sterna antillarum).* U.S. Fish and Wildlife Service published report. 90 pages.

Thompson, B. C., J. A. Jackson, J. Burger, L. A. Hill, E. M. Kirsch, and J. L. Atwood. 1997. Least Tern (*Sterna antillarum)*. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 290. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.



Black Tern – *Chlidonias niger*
Guifette noire – Golondrina-marina Negra

***Status Summary**:*

Continental conservation priority: Moderate concern
Regional conservation vulnerability: **High Concern**

Population trend	[4]
Relative abundance	[2]
Threats to breeding	[4]
Threats to non-breeding	[3]
Breeding distribution	[2]
Non-breeding distribution	[2]
Area importance of BCR11	[4-5]

Continental and BCR11 populations	100,000 - 500,000;	Unknown
Population trend in BCR11	[-0.69%/yr, p = 0.77]	
Population trend in North America	[-1.7%/yr, p = 0.29]	
Abundance status in BCR11	Locally common	
BCR11 % of continental population	> 50%	

Occurrence in NP&PR: Locally common, breeding in loose colonies throughout the region.

Habitat requirements: Nests in shallow, highly productive wetlands with emergent vegetation in freshwater (sometimes brackish or alkaline) marshes, along prairie sloughs, lake margins, edges of islands or slow-moving rivers, wet meadows, bogs, shrub-swamps and occasionally large stock ponds. Prefers wetlands surrounded by grassland rather than agricultural fields.

Global distribution: In Old World, occurs in northern Europe, Russia, and Siberia, south to Mediterranean, Asia Minor, Turkestan, and Caspian and Aral Seas. In North America, occurs from British Columbia, east through northern Saskatchewan to Nova Scotia, south locally to southern California, Colorado, Nebraska, southern Illinois, Ohio, Pennsylvania, and northern New England. A single breeding record exists from coastal New Jersey. Winters in the Americas, along both coasts from Panama south to Peru, Surinam, and French Guiana, rare in Brazil, Uruguay, and Argentina. Casual in Hawaii.

Issues in NP&PR:

- Declining throughout much of range, likely due to habitat loss.
- Maintenance of stable water levels in wetlands used for recreation.
- Cattail encroachment on prairie wetlands.
- Contaminants may be an issue given the Black Tern's insectivorous feeding habits.

***Existing action**:*

- Continental status assessment and conservation plan completed and available at **www.r6.fws.gov/blacktern/index.html**.
- A review of the effects of management practices on this species is available from the Northern Prairie Wildlife Research Center.

Research needs:

- Determine habitat selection, particularly role of wetland complexes.
- Determine effective ways to control cattail encroachment on prairie wetlands.
- Determine site fidelity and how it is influenced by water conditions.

Action needed:

- Develop special surveys or refine existing surveys to identify colonies and confirm distribution and size of populations.

- Protect habitat, particularly that supporting breeding colonies.
- Open cattail-choked wetlands to provide appropriate interspersion of water and emergent vegetation.
- Prevent encroachment of woody vegetation around wetlands.
- Prevent residential development around and recreational use within wetlands.
- Maintain wetland complexes.

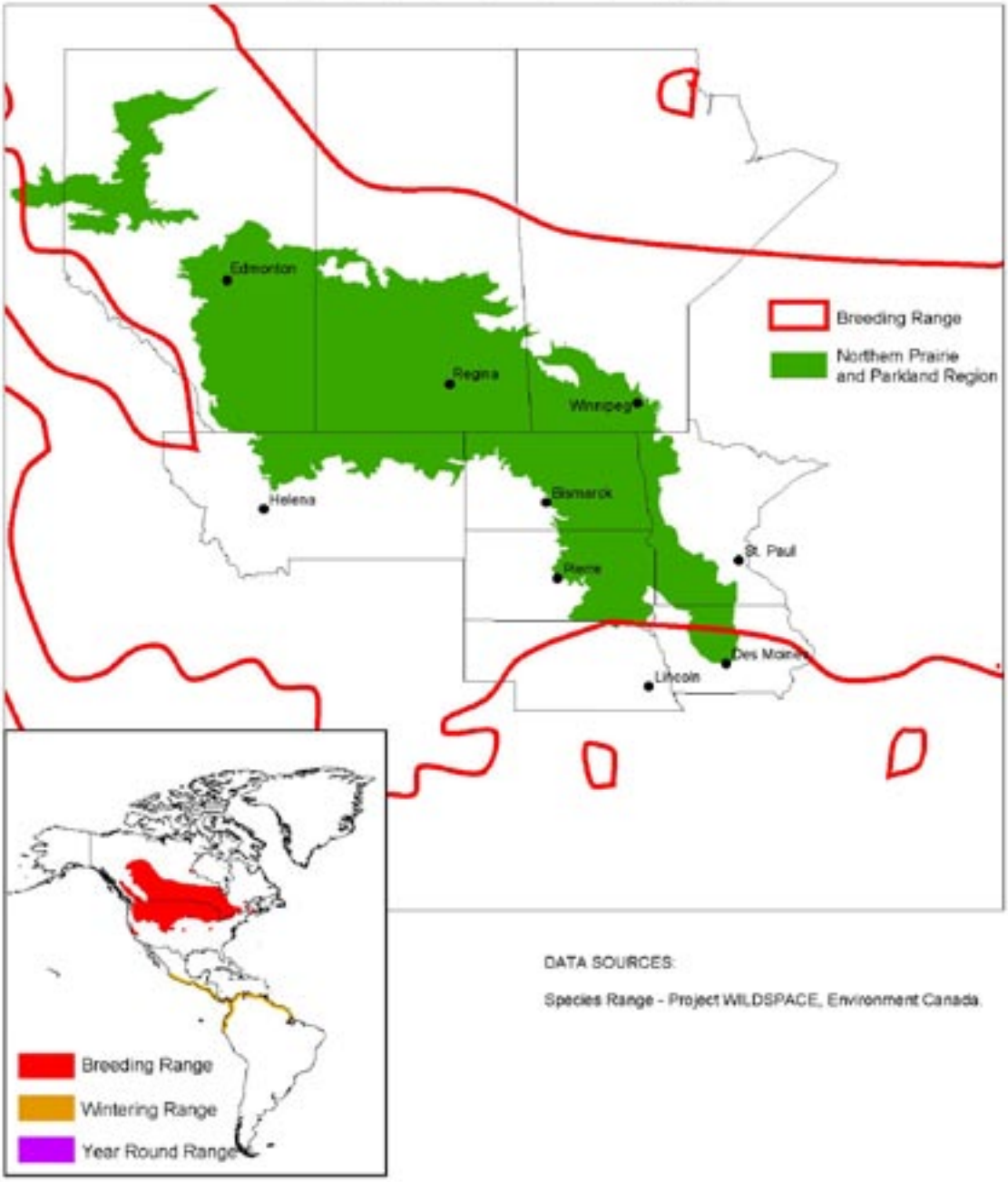
***Primary regional contacts**:* Dave Naugle, University of Montana.

References:

Dunn, E. H., and Agro, D. J. 1995. Black Tern. *In* A. Poole and F. Gill, eds. The Birds of North America, No. 147. The Academy of Natural Sciences, Philadelphia and the American Ornithologists' Union, Washington, D. C.

Shuford, W. D. 1999. Status Assessment and Conservation Plan for the Black Tern (*Chlidonias niger surinamensis*) in North America. U.S. Fish and Wildlife Service, Denver, CO.

Black Tern Distribution in the Northern Prairie and Parkland Region



DATA SOURCES:

Species Range - Project WILDSPACE, Environment Canada.

APPENDIX E: KEY STAGING AND STOPOVER SITES USED BY WHOOPING CRANES IN THE NORTHERN PRAIRIE & PARKLAND REGION

The Whooping Crane does not breed in the NP&PR, but staging and stopover sites in the NP&PR are critical to migration of Whooping Cranes between their wintering grounds on the Texas Coast and their breeding grounds in the Northwest Territories and Alberta. The birds use a variety of wetland and upland sites, and use of a particular location can be highly variable. General areas and specific locations where Whooping Cranes are regularly seen during migration are listed below.

- SOUTH DAKOTA: Hughes, Potter, and Sully counties.

- NORTH DAKOTA: Long Lake National Wildlife Refuge (Burleigh and Kidder counties); northern McLean County; southwest Ward County; Audubon National Wildlife Refuge (central McLean County); Burke, Divide, Williams, and Mountrail counties.

- MONTANA: Medicine Lake National Wildlife Refuge (Sheridan County).

- MANITOBA: Only occasional sightings in southwestern Manitoba.

- SASKATCHEWAN: In the vicinity of the following towns: Meadow Lake, North Battleford, Meacham, Colonsay, Humboldt, Alan, Outlook, Simpson, Govan, Weyburn and Estevan. The following lakes: Midnight Lake, Witchekan Lake, Muskiki Lake, Radisson Lake, Blaine Lake, Last Mountain Lake NWA, Lake Lenore, Kutawagan Lake, Quill Lakes, and the South Saskatchewan River.

- ALBERTA: St. Paul area.

APPENDIX F. KEY CANADIAN WATERBIRD SITES

Canadian lakes in the Northern Prairie and Parkland Region which host significant numbers of waterbirds during the breeding season, during migration, or which meet the various criteria for Important Bird Area (IBA) site designation. Sites are identified on accompanying map by map reference number. (More detailed site information will be produced in a separate document).

Map Reference Number	Lake Name	Species of significance at site
ALBERTA		
1	Antoine Lake	Double-crested Cormorant, Ring-billed Gull, California Gull
2	Beaverhill Lake	American White Pelican, Franklin's Gull, California Gull, Ring-billed Gull, Sandhill Crane, Forster's Tern
3	Buffalo Lake	Eared Grebe, American White Pelican, Double-crested Cormorant, California Gull, Ring-billed Gull, Franklin's Gull
4	Cardinal Lake	Eared Grebe, Franklin's Gull
5	Chip Lake	California Gull, Franklin's Gull, Great Blue Heron
6	Cooking Lake	Eared Grebe, Franklin's Gull, Forster's Tern
7	Dalemead Lake	California Gull, Ring-billed Gull, Franklin's Gull, Double-crested Cormorant
8	Frank Lake	Eared Grebe, Franklin's Gull, White-faced Ibis, American Coot (M), Bonaparte's Gull (M), Western Grebe (M)
9	Hastings Lake	Ring-billed Gull, California Gull, Western Grebe, Double-crested Cormorant, Forster's Tern, Great Blue Heron
10	Irricana Reservoir	Eared Grebe, Franklin's Gull, Black Tern, American Coot (M)
11	Jessie Lake	Eared Grebe, Franklin's Gull
12	Kimiwan Lake	Franklin's Gull
13	Lac La Biche	Double-crested Cormorant, Ring-billed Gull, Caspian Tern, American White Pelican, Western Grebe
14	Lac Ste. Anne	Western Grebe, Eared Grebe, California Gull, Ring-billed Gull, Common Tern
15	Lake Newell and Kitsim Reservoir	Double-crested Cormorant, Ring-billed Gull, California Gull, American White Pelican, American Coot (M), Franklin's Gull, Caspian Tern
16	Lesser Slave Lake	Western Grebe, Common Tern, Great Blue Heron
17	McGregor Lake	Western Grebe (M), Franklin's Gull, American White Pelican
18	Milk River Ridge Reservoir	California Gull, Ring-billed Gull

Appendix F ……. Continued

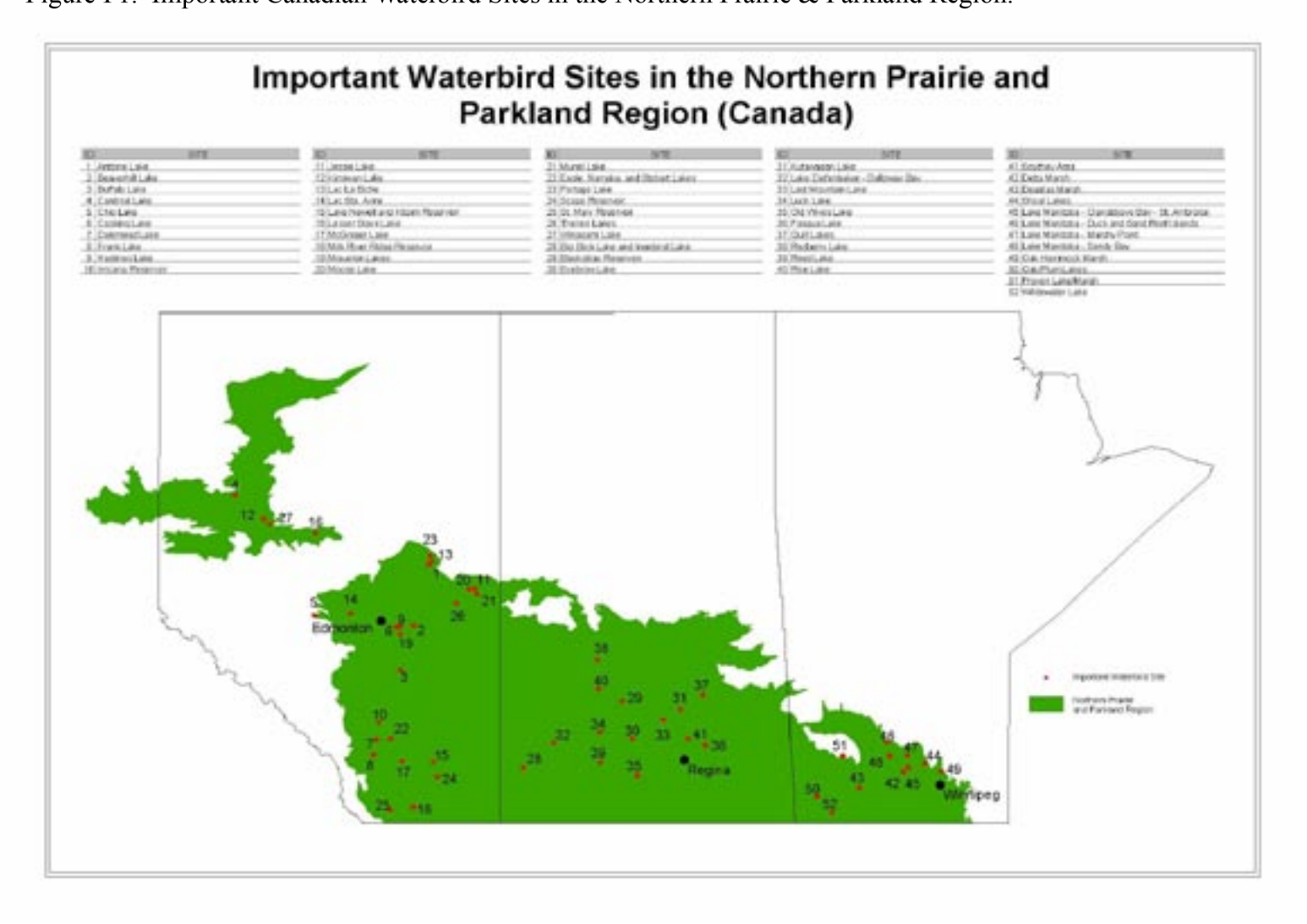
Map Reference Number	Lake Name	Species of significance at site
19	Miquelon Lakes	California Gull, Ring-billed Gull
20	Moose Lake	Franklin's Gull, Forster's Tern, Eared Grebe, Western Grebe
21	Muriel Lake	Double-crested Cormorant, California Gull, Ring-billed Gull, Franklin's Gull, Western Grebe, Common Tern
22	Eagle / Namaka / Stobart Lakes	Eared Grebe, American Coot (M), Black-crowned Night-Heron, Franklin's Gull, Bonaparte's Gull (M)
23	Portage Lake	Double-crested Cormorant
24	Scope Reservoir	American White Pelican, Double-crested Cormorant, Ring-billed Gull, California Gull, Franklin's Gull, Caspian Tern
25	St. Mary Reservoir	California Gull, Ring-billed Gull, American White Pelican, Eared Grebe
26	Therien Lakes	California Gull, Ring-billed Gull, Western Grebe, Eared Grebe
27	Winagami Lake	Franklin's Gull, Great Blue Heron
SASKATCHEWAN		
28	Big Stick / Ingebrigt Lake	Franklin's Gull, Ring-billed Gull
29	Blackstrap Reservoir	Franklin's Gull, Black Tern
30	Eyebrow Lake	Franklin's Gull, Eared Grebe, Black-crowned Night-Heron, Black Tern, Forster's Tern
31	Kutawagan Lake	Sandhill Crane (M)
32	Lake Diefenbaker - Galloway Bay	Great Blue Heron, Sandhill Crane (M)
33	Last Mountain Lake	American White Pelican, Double-crested Cormorant, Western Grebe, Ring-billed Gull, Forster's Tern, Eared Grebe, Sandhill Crane (M), Black-crowned Night-Heron
34	Luck Lake	Eared Grebe, Sandhill Crane (M), Ring-billed Gull, Franklin's Gull, American Coot (M), Black Tern, Western Grebe (M)
35	Old Wives Lake	American White Pelican, Western Grebe, Great Blue Heron, Franklin's Gull, Ring-billed Gull, Black-crowned Night-Heron
36	Pasqua Lake	American White Pelican, Western Grebe
37	Quill Lakes	American White Pelican, Sandhill Crane (M)
38	Redberry Lake	American White Pelican, Double-crested Cormorant, Ring-billed Gull, California Gull
39	Reed Lake	American White Pelican, Eared Grebe, Franklin's Gull
40	Rice Lake	Franklin's Gull, Eared Grebe, Black-crowned Night-Heron, Whooping Crane (M)
41	Southey area	Sandhill Crane (M)

Appendix F ……. Continued

Map Reference Number	Lake Name	Species of significance at site
MANITOBA		
42	Delta Marsh	Western Grebe, Forster's Tern, Least Bittern, Franklin's Gull
43	Douglas Marsh	Yellow Rail
44	Shoal Lakes	American White Pelican, Eared Grebe, Western Grebe, Common Tern, Ring-billed Gull, Herring Gull
45	Lake Manitoba - Clandeboye Bay	Common Tern, Forster's Tern, Double-crested Cormorant, Ring-billed Gull
46	Lake Manitoba - Duck and Sand Reef Is.	American White Pelican, Double-crested Cormorant, Ring-billed Gull, Common Tern, Caspian Tern, Herring Gull
47	Lake Manitoba - Marshy Point	Western Grebe, Black-crowned Night-Heron, Franklin's Gull
48	Lake Manitoba - Sandy Bay	Western Grebe
49	Oak Hammock Marsh	Franklin's Gull, American Coot (Migrant), Eared Grebe
50	Oak/Plum Lakes	Eared Grebe, Western Grebe, Franklin's Gull, American Coot (M), Sandhill Crane (M)
51	Proven Lake/Marsh	Black-crowned Night-Heron, Double-crested Cormorant, American Coot (M)
52	Whitewater Lake	Franklin's Gull, Eared Grebe, Black-crowned Night-Heron

(M) = Species peak use occurs during migration.

Figure F1. Important Canadian Waterbird Sites in the Northern Prairie & Parkland Region.



APPENDIX G. WATERBIRD CONSERVATION ISSUES IN THE NORTHERN PRAIRIE AND PARKLAND REGION

Waterbird populations and habitat in the NP&PR are subjected to a variety of threats. Below is a list of potential waterbird conservation issues identified by plan development participants at meetings in Saskatoon, Edmonton, and Bismarck. Many of these issues are interrelated with varying degrees of cause and effect. Importance and impact of issues varies among species and regions. A prioritized list of conservation issues and threats to waterbirds in the Northern Prairie & Parkland Region is provided in Table 6 of the Northern Prairie & Parkland Waterbird Conservation Plan.

Wetland Loss / Deterioration

- Drainage, water removal, and reduced wetland recharge.
- Drainage by landholders is regulated but there is a potential lack of enforcement in some areas. In addition, channelization on floodplains is promoted by some jurisdictions as a means of flood control.
- Forest harvest and other land clearing activities in the boreal transition zone may be altering water flows and wetland recharge.
- Development of roads to support forest and oil/gas industries may reduce wetland recharge by affecting flow of surface water.
- Water withdrawal to support industrial and agricultural activities reduces wetland numbers and water levels.
- Long-term drought (natural cycles, climate change) accelerates wetland loss by simplifying cultivation or filling of dry basins, which can destroy a basin's future ability to hold water.
- Increased pressure by the oil and gas industry to drill in dry lakebeds, which can potentially degrade the site when the lake refills.
- Sedimentation in agricultural areas has resulted in a loss of available habitat for rails and bitterns, including nesting and feeding areas.
- Wetland water quality may deteriorate as a result of a variety of activities, including recreation, agricultural runoff, and urban or road runoff.
- Mitigation banks can have a detrimental effect on regional wetland density and variety. There is the potential where the acreage of a number of small wetlands is replaced, through mitigation, with one large wetland of similar acreage that may not provide a suitable variety of wetland habitat conditions.
- Loss of wetland complexes (wetlands of various sizes, depths, degree of permanency and type along with the associated uplands) can be detrimental to species that require a variety of wetland habitats for different aspects of their life cycle (breeding, foraging, brood rearing, moulting, etc.).
- Wetland regulations should protect surrounding uplands as well as wetlands.

Upland Habitat Management / Degradation / Loss

- Shoreline development along lakes and waterways (industrial, agricultural, urban and recreational).
- Direct loss of nesting habitat for shoreline and upland species.

- Loss of backshore tree species changes wind dynamics, which are important to emergent vegetation structure and can affect grebe colony location.
- Chronic over-grazing and timing of grazing of cattle.
- Conversion of lands to more intensive uses, which might increase runoff and contaminant flow as well as reduce upland and wetland cover.
- Long-term drought allows access to riparian area for haying and possible cultivation. Cultivation has many potentially negative effects, including encroachment on riparian zones, shoreline erosion, sedimentation of wetland and riparian habitats, and complete loss of wetland basin.
- Land clearing for agriculture and forest clear cutting in the boreal transition zone directly affects nesting habitat for some species.
- Fragmentation of habitat by agriculture and the oil/gas industry might influence habitat use by area-sensitive species and possibly lead to increased predation.
- The encroachment of treed areas in the prairies can provide habitat for avian and mammalian predators that were previously absent.
- Fire suppression programs in Alberta's urban-wildfire interface involve selective logging that might impact tree-nesting species as well as alter wetland recharge.
- Infrastructure (e.g., roads, substations) associated with wind generators causes fragmentation of once-contiguous prairie. Development of coal-bed methane could have similar impacts.

Water Management

- Water manipulation of smaller wetlands (wetland habitat provision, vegetation management) for waterfowl or other species, depending on timing of draw-down, filling (flooding) or release of waters, can affect nesting and feeding sites of waterbird or other water-dependent species.
- Flooding or drawdown for power generation and irrigation can affect existing island-nesting colonial species in reservoirs as well as below the dam for shoreline- or island-nesting species (e.g., Least Terns). The effect can be actual flooding of the site or destroying the island's integrity by joining it to the mainland and increasing the risk of nest predation.
- Regeneration of riparian cottonwood forests (sites for colonial tree nesting species) has been reduced by controlling water-level fluctuations.
- Drying of basins for flood storage can result in loss of prey (fish stocks) for some species.
- Reduced water level fluctuations (static water levels) in native marshes can influence structure and composition of emergent vegetation or lead to encroachment of vegetation (e.g., Delta Marsh, Manitoba).
- In some portions of the NP&PR (i.e., Peace Parkland), wetlands are drained as a water source for irrigation.
- The timing of de-watering and haying has important implications for rails, cranes, and bitterns during breeding season.
- Water bodies managed for recreation may result in artificial flooding, drawdown, or reduced water level fluctuations.
- Use of surface water for oil and gas production on the prairies directly affects water tables at drilling sites. Depending on the geographic area and level of activity, water table drawdown can affect a large number of wetlands.

Contaminants

- Spills from oil industry activities or infrastructure and container transport accidents can affect an entire wetland ecosystem, as can industrial, urban, and recreational runoff.
- Nutrient enrichment in fresh water lakes may affect birds that depend on water clarity for successful foraging (e.g., loons, grebes).
- High use of pesticides within the Northern Prairie & Parkland Region and subsequent runoff into wetlands likely affects local waterbird populations. Similarly, pesticide use on wintering areas can result in toxic accumulation, which likely has an indirect effect on waterbird populations within the NP&PR.
- Fertilizer runoff from agricultural fields and runoff from large livestock feedlots has a direct effect on water quality and leads to increased eutrophication of wetlands.
- Long range transport of air pollutants and use of water as a coolant for power generation facilities can lead to contamination and thermal pollution of some wetlands.
- Oil industry use of saline groundwater for drilling and exploration can contaminate wetlands.
- Rain and snowmelt runoff from impermeable surfaces in urban landscapes flushes a variety of harmful materials, including salts, directly into wetland landscapes.

Disturbance / Recreation / Eco-tourism

- Increased shoreline development has resulted in increased activity, runoff, noise, and other disturbance to water-dependent species.
- Recreational activities involving motorized (jet skis, motorboats, float planes, snowmobiles in winter) and non-motorized watercraft may affect waterbirds. Effects can be direct through disturbance (e.g., swamping of nests) or indirect through loss or degradation of habitat (e.g. construction of access points, seepage of oil into water).
- Disturbance often leads to increased nest predation by avian predators (i.e., gulls) when birds are scared off nests.
- Destruction of emergent vegetation by winter recreation vehicles degrades habitat for some species returning in the spring.
- Research, avian disease cleanups, monitoring, and banding can have negative effects depending on the timing and level of activity, especially for colonial nesting species.
- Unregulated birding and eco-tourism can lead to increased disturbance.
- Land-based all-terrain vehicles and feral pets (e.g. dogs, cats) are problems at some colonies.

Climate Change

- The NP&PR is a naturally dynamic system and wildlife in the region are adapted to varying levels of precipitation. However, changes in the duration and degree of variation (e.g. rainfall/snowfall patterns changing and wetland hydrology being affected) could negatively impact many species.

- Extended periods of drought can lead to wetland habitat destruction and loss as smaller wetlands are accessed and cultivated, which diminishes their value when water returns.

- Waterbird distribution may be influenced by long-term environmental changes. For

example, expansion of the White-faced Ibis may have been influenced by extensive flooding of traditional habitat in the southwest. Similarly, northwestern range expansion of some herons into the NP&PR may be related to warmer conditions.

Abundant Species and Nuisance Congregation Sites

- Numbers of some waterbird species, notably Double-crested Cormorants, are rapidly increasing in portions of the NP&PR, which has led to conflicts with commercial and sport fisheries.
- Human development locations (e.g., garbage dumps, waste-water reservoirs, airports) are creating an artificial site where waterbird species (e.g. Ring-billed Gulls) congregate and create a potential nuisance, danger, or health issue to humans.
- Increased numbers and concentration of gulls can potentially result in increased predation of waterfowl and shorebird nests.
- Increased numbers of some waterbird species may lead to local degradation of nesting habitat such as loss of tree nesting sites or reduced water quality.
- Expanding populations are directly affecting habitat availability and quality for other species (e.g., island-nesting terns).

Aquaculture and Fisheries

- Depredation of fish at aquaculture facilities by Double-crested Cormorants, American White Pelicans, and Great Blue Herons is common, leading to conflict or persecution of these waterbirds. Similar problems exist with commercial and sport fisheries, as noted above. In some cases, waterbird colonies have been illegally destroyed
- Depredating waterbirds in the United States can be taken with USFWS depredation permits.
- Artificially concentrated food supplies at rearing ponds may result, in some areas, in a shift of waterbird use or colonies to take advantage of this supply.

Disease, Toxicity, and Parasites

- Avian diseases such as Newcastle's disease and avian cholera, as well as blue-green algae and botulism toxins regularly occur on prairie lakes, often killing thousands of waterbirds. However, there is much uncertainty as to the degree and the species affected by various diseases.
- Certain lakes, due to specific physical features (e.g., terminal basin), are prone to high levels of waterbird mortality.
- Poisoning by avian botulism, in particular, may claim significant numbers of birds. Botulism outbreaks at Pakowki Lake, Alberta in the 1990s killed at least 19 species of waterbirds; botulism killed at least 15 species of waterbirds in one season at Medicine Lake National Wildlife Refuge in Montana. Impacts on populations are not known.
- Concentrations of colonial species increase the potential for large die-offs.
- Water quality may be a factor in algal blooms; drought conditions are also factor in the trigger of potential outbreaks
- The poultry industry can be affected by outbreaks of Newcastle's disease; other disease-related issues may relate to human health or agriculture.

- The spread of West Nile Virus is causing increased use of pesticides for mosquito control. This may be detrimental to birds and may become a concern in our region with the expansion of the virus.

Exotic and Invasive Species

- Invasive weeds, such as purple loosestrife, are changing prairie wetland habitats and are negatively affecting some waterbird species such as rails.
- In the last 50 years, narrowleaved cattail has spread into the NP&PR; this species often hybridizes with common cattail. Many wetlands in the NP&PR are now dominated by thick, monotypic stands of hybrid cattail, which are likely detrimental to many waterbirds. See **www.npwrc.usgs.gov/resource/othrdata/cattail/kantrud.htm** for more information.
- In the southeastern portion of the NP&PR, reed canary grass is dominating areas that used to be sedge meadow and mesic prairie.
- Non-native insects can serve as vectors for diseases.
- Non-native fish are being introduced to fresh water lakes, changing prey communities.
- Non-native fish such as carp are detrimental to emergent and submerged vegetation in wetland communities, which can alter native vegetation structure and fish communities. Carp foraging can also cause an increase in turbidity, which is a foraging problem for sight-based waterbirds (i.e. loons and grebes).
- Other introduced species to a wetland may change the prey base; for example, fathead minnows can lower invertebrate populations in a wetland.

Wildlife Depredation

- Depredation of corn and small grain crops by Sandhill Cranes is a problem in some areas.
- Current measures of control include scare (propane) cannons, depredation permits, and sport hunting.
- Depredation control appears to have no negative effect on waterbird populations at this time.
- Depredation of fish in aquaculture facilities is addressed in aquaculture section.

Ingestion and Solid Waste Products

- Lead poisoning of loons and grebes from ingestion of fishing sinkers is a problem. The use of alternative weights/sinkers is being promoted in some jurisdictions.
- Plastic pollution can be detrimental to marshbirds, particularly loons and grebes (i.e., plastic holders for six-packs of beer or pop cans).
- Fishing gear, particularly discarded monofilament line and nets, can cause mortality of individual waterbirds. From a population standpoint, this is more likely a concern on the wintering areas where the birds (e.g., loons and grebes) concentrate in large flocks on coastal waters with high levels of commercial fishing.

Harvest Management

- American Coot, Common Moorhen, Sandhill Crane, and several species of rails are harvested in various areas of the Northern Prairie & Parkland Region, but quality of

harvest information is low.
- Better knowledge of the distribution and extent of harvest and its effects on population parameters is needed to make informed decisions about these populations.
- Waterbird hunters may provide important support for waterbird conservation, but interest in waterbird hunting is low and declining in many areas.
- Changing demographics of hunters and issues of access to wildlife might provide opportunities to improve support for conservation of wetland habitat.

Collisions

- Waterbirds often collide with towers, power lines, fences, and aircraft; construction of manmade structures through and near marshes or across and along waterways should be minimized. Environmental impact assessments are addressing these issues in some areas of new development.
- Proliferation of cellular communication towers and other types of towers (wind power generation towers) may have the potential to become a major mortality factor.
- Presence of open space at airports provides potential sites for roosting birds and potential for aircraft/bird strikes.

Predators

- Predation may be a greater concern for colonial nesting species. Predation is likely site-specific, although relative influence on colonial and non-colonial species is unknown.
- Nests at some sites may be particularly susceptible to naturally occurring mammalian and avian predators.
- Colonies close to urban areas may suffer from increased levels of cat, dog, and gull predation.

Creation of Artificial Islands

- Islands are frequently created as a result of reservoir development or habitat improvement efforts for waterfowl. These islands may be particularly attractive to colonial waterbirds and may cause shifts or increases in local populations.
- Islands created from dredge spoils can have heavy contaminant loads that can cause teratogenesis and mortality of waterbird embryos.

Prescribed fire

- Although fire is a natural modifier of the landscape, repeated annual spring burning can result in a significant loss of waterbird production due to a decrease in nesting cover quality and quantity. Early nesting waterbird species or over-water nesters prefer and rely upon residual vegetative cover from the previous year's growth, which is removed by spring burns. These early nests are often more successful than later nests. In many areas nesting success can be the most critical factor in sustaining waterbird populations.
- Timing of prescribed fire regimes has important implications for some species (e.g., rails, American Bitterns). Prescribed fire is a common management tool on wildlife refuges; impacts on marshbirds should be incorporated into burn schedules.
- In Alberta's boreal transition zone, burning around urban areas as a protection against

forest fires is a recent issue.

- Burning may negatively impact soil organic layer depending on fire intensity and duration, resulting in poor moisture retention and potential erosion.
- Excessive burning might encourage growth of invasive weeds.
- Periodic burning of native uplands (every 4 - 7 years) may improve stand vigor and encourage regrowth where grassland stands are lodged.
- Prescribed fire may reduce shrub encroachment, although timing and wetland water level are likely critical.

Wintering areas of NP&PR Waterbirds

- Few waterbirds winter in the Northern Prairie & Parkland Region. However, what happens on the wintering sites directly influences regional waterbird populations. Issues and threats on the wintering grounds will have to be identified and addressed by organizations and agencies responsible for those areas.

APPENDIX H. WATERBIRD SAMPLING ISSUES AND INFORMATION NEEDS FOR THE NORTHERN PRAIRIE AND PARKLAND REGION

Much is not known about waterbirds in the NP&PR, and many assumptions have been made in development of the Northern Prairie & Parkland Waterbird Conservation Plan. As information is gathered to increase understanding and aid conservation of waterbirds in the NP&PR, the following key assumptions should be evaluated. First, the Plan assumes that existing survey information such as the Breeding Bird Survey, although imperfect, provides some indication of population trends and is useful in prioritizing species. The Plan also assumes that waterbirds enjoy substantial benefits from waterfowl conservation activities in the Region, although response to waterfowl conservation actions will vary among species. In addition, the Plan assumes that landscapes are the appropriate scale for conservation planning, given the importance of wetland/upland complexes to waterbirds and the dynamic nature of the Prairie Pothole Region.

Sampling and Monitoring Issues

The foremost information need identified by the NP&P Waterbird Conservation Plan is the development and institution of a regional waterbird monitoring program. At a planning meeting held at Bismarck, North Dakota in February 2002, a concerted effort was made to identify issues related to inventorying and monitoring of waterbirds in the Northern Prairie and Parkland Region. Following is a brief summary of issues discussed there.

- The NP&PR plays a major role in continental waterbird conservation, so sampling efforts should be coordinated with continental efforts. However, coordination with continental efforts is secondary to meeting NP&PR objectives of spatially explicit conservation planning. Two realities of the NP&PR must be met in sampling: most of our wetlands are small and are non-permanent, and waterbirds shift geographically in response to water conditions. Some index to water conditions (i.e., percent of wetland that is inundated, May pond numbers from waterfowl surveys, Palmer Drought Index) should be included in sampling to help explain variation caused by water conditions.

- The goal of sampling waterbirds may be to locate colonies or wetlands with breeding marshbirds, calculate population estimates, determine population trends, or determine habitat relationships. Methodology of sampling will vary depending on specific goals. Given limited resources, annual variability in water conditions, and the diversity and number of waterbirds in the NP&PR, estimation of populations is unlikely to be successful, and sampling efforts should focus on determining trends and habitat relationships. Ideally, demographics should be considered in waterbird conservation planning, but an understanding of demographics will likely follow acquisition of more basic information. Surveys should be statistically sound and designed to meet identified goals, rather than be opportunistic.

- Sampling should be extensive, covering many wetlands over a broad geographic area. Inclusion of information on water conditions and vegetation will aid understanding of populations and habitat selection. Intensive sampling may be required to locate reclusive species (e.g., Yellow Rail), but intensive sampling, particularly if vegetation is sampled, will reduce the number of points that can be sampled for a given amount of

effort. Roadside sampling may be necessary to maintain large sample sizes and help attract volunteers that likely will be necessary to conduct the surveys. Ideally, consistent data should be collected for the entire NP&PR as either a regional effort or as part of a continental sampling plan.

- Sampling methodology will vary among species. Because several of the species of interest are cryptic, playback of tape-recorded calls likely will be needed to increase response on surveys. NP&PR will follow the continental lead on playback techniques, including timing of surveys, sequence of calls, and equipment. Playback is very useful for many species, but there are issues of species dominance, regional dialects, and increased variance that go along with increased detection using playback. Results of current evaluation of sampling protocol involving playback will provide insight regarding use of playback. In addition, different surveys might be needed for colonial and non-colonial species.

- Identifying the sample unit is critical to purpose and interpretation of data, particularly in development of habitat models. Sample units may be individual wetlands, area-limited point counts, or transects. Similarly, size and placement of sample units will affect results. The landscape surrounding survey points also should be sampled to better understand population trends as well as to determine habitat associations. Sample units should be scientifically, not opportunistically, located to be representative of populations and habitat. Placement of sample units will be influenced by their type as well as stratification by habitat type or landscape characteristics.

- Logistics will influence final sample design and survey execution, including route placement, availability of personnel, number of routes, data collected, coordination with continental efforts, provision for supplementary data, and funding. Training of personnel is important to ensure consistency.

- Data must be incorporated into a central database. A standardized, permanent, and accessible database will enhance regional and continental assessments of waterbird populations and habitat use, as well as aid integration among partners and conservation plans.

Obviously, sampling waterbird populations, particularly cryptic species, in the NP&PR will not be an easy task. A couple of options would add considerably to our ability to monitor populations with relatively little additional expense. Many waterbirds are recorded on BBS routes in the NP&PR. Increasing the number of BBS routes, especially if new routes were placed in areas of high wetland density, would increase the number of waterbird detections. This would increase the power of BBS data to detect changes in waterbird numbers in the region, as well as provide more data for estimation of habitat models. Canada's Grassland Bird Monitoring Program could serve as a model for increased BBS coverage. In this program, routes were placed in areas of good habitat and sampled using the same protocol as BBS routes; data were recorded and stored along with BBS data. Data can be analyzed using just BBS or GBM data or with both combined. This option has several advantages: large volunteer base, existing data repository and analysis operations, an interest in expanding the program, and consistent sampling protocol. Including environmental data (e.g., water conditions) in survey analysis could reduce the variance in trend estimates, improving the usefulness of survey data.

Another option would be to sample waterbirds along waterfowl survey routes. A major benefit of this option is that a stratified sample of transects already exists in areas of high wetland abundance throughout much of North America. Many of these transects, particularly in the NP&PR, follow roads, which would ease logistics of sampling. Using waterfowl survey transects provides two additional, major benefits. First, waterfowl biologists provide an annual May pond count, which would provide an excellent index to wetland availability and water conditions. Second, basin locations and upland cover are mapped along transects, which would provide valuable habitat information in areas lacking landcover information developed from satellite imagery or wetlands information such as that provided by the National Wetlands Inventory.

Sample design and protocol for waterbird monitoring are being developed at a continental level by the Waterbird Monitoring Partnership. Coordinators for the NP&PR Waterbird Conservation Plan will work with regional partners and the continental Waterbird Monitoring Partnership to develop monitoring programs for the NP&PR.

Waterbird Life History Information Needs

Sound conservation planning in the NP&PR will require a better understanding of waterbird natural history and life history.

- Basic breeding biology, demography, and life history are unknown for many species, particularly marshbirds. Factors such as reproductive effort (i.e., proclivity for multiple broods or renesting after initial failure) and success, recruitment, adult survivorship, dispersal distances, and age at first breeding are crucial to understanding factors that may limit different species.

- Adult survivorship is thought to be important to the persistence of many species because many waterbirds are quite long-lived. Understanding survivorship will require comprehensive banding programs with an emphasis on long-term resightings and recoveries.

- Breeding site philopatry and colony dynamics are unknown for many colonial species. This knowledge gap is particularly acute for marsh-nesting colonial birds such as Franklin's Gull and Eared Grebe. Colonies of these species frequently shift location, likely due to water conditions and food availability.

- Factors affecting productivity and survival are largely unknown, especially for species already known to be declining. Potential threats include wetland drainage, agricultural practices, pesticides, disturbance, and climate change. It is also important to understand limiting factors throughout the annual cycle for each species.

- Impacts of diseases and avian botulism on waterbirds are poorly understood. Numbers of waterbirds killed during outbreaks are largely unknown, especially for small and cryptic species.

Waterbird Habitat Relationship Needs

Understanding waterbird habitat relationships will better enable conservation and management of waterbird habitat.

- Habitat requirements of waterbirds are poorly known, including preferences for wetland type, vegetation composition and structure, and preferred water depth. This is especially true for non-colonial species. Habitat requirements will likely vary throughout the annual cycle.

- The role of landscape characteristics, including presence of wetland complexes and composition of surrounding landscape, on waterbird demographics and habitat selection needs to be better understood. Also, the relative value of small and large wetlands needs to be identified, as well as the different threats that face different-sized wetlands.

- The appropriate spatial scale for conservation planning must be understood, particularly if surrounding landscapes strongly influence waterbirds on a given wetland. This may be especially important for colonial breeders that may forage many kilometers beyond the boundaries of a protected colony site. The spatial structure of populations might also influence gene flow and uniqueness of colonies.

- Acquisition of a digital wetlands database similar to the U.S. National Wetlands Inventory (Figure1) would greatly aid conservation planning in the Canadian portion of the NP&PR. Additional information on the National Wetlands Inventory is available at **wetlands.fws.gov**.

- Waterbird habitat must be identified and prioritized for conservation. Many approaches can be used, including identification of important colonial bird nesting sites through the IBA program and development of landscape-level habitat models using GIS and digital data for non-colonial nesters. Existing information sources such as the "thunderstorm map" developed by the USFWS HAPET office in Bismarck, North Dakota can fill some information needs and serve as a model for development of similar, waterbird-specific information. Maps of this nature are extremely useful for targeting private lands for conservation or management, such as through the USFWS's Partners for Wildlife program.

- Linkages between breeding, staging and wintering areas need to be identified, and the relative influence of each to annual survival identified. Similarly, linkages among breeding populations should be identified, as impacts of local events are likely lower on widespread and undifferentiated populations than on unique, local populations.

- The role of annual variation in habitat conditions must be better understood, as it has major implications for conservation strategy. Species that are highly philopatric even under poor habitat conditions might be well served by protection and management of specific sites, but more nomadic or dispersed species would require a widespread network of potential sites or landscape-level protection throughout the region.

Waterbird / Human Interaction Information Needs

Humans can have major direct and indirect impacts on waterbird habitat and populations. However, impact of human interactions likely varies among species and situation. The following impacts on waterbirds need better understanding:

- Impact of harvest. With the exception of Sandhill Crane, the impact of harvest is poorly known for hunted waterbirds. Harvest is assumed to be minimal with little impact on populations, but we need to better understand how harvest might affect species, particularly on a local basis. The USFWS's HIP (Harvest Information Program) is providing additional harvest information, but directed research may be needed to address specific harvest-related questions.

- Interactions with fisheries. Aquaculture (fish farms) can have positive as well as negative effects on waterbirds, but impacts are poorly understood and communicated and are often hotly contested. Apparent conflict between sport fisheries and abundant species such as Double-Crested Cormorants and American White Pelicans sometimes results in local persecution of nesting colonies of these species.

- Monitoring of sub-lethal effects of contaminants. Resilience to lethal and acute toxicity appears to vary among species, as some waterbirds inhabit highly polluted sites and others appear vulnerable to effects of contaminants.

- Effect of recreational activities. Effects on over-water nesting species may be particularly acute due to wave action and proximity to human activity. Development on shores of lakes used for recreation causes loss of nesting habitat for shore- and tree-nesting species. People driving motorized watercraft sometimes cause direct mortality of waterbirds.

- Effects of airports, refuse dumps, aquaculture facilities, and other congregation sites. In populated areas, artificial loafing areas and sources of food may alter behavior and demographics of waterbird populations.

Selected Avian Monitoring Bibliography and Web Resources

A wealth of information on waterbirds, including searchable bibliographic databases, annotated bibliographies, and effects of management practices on waterbirds, is available at Northern Prairie's website **www.npwrc.usgs.gov/resource/literatr/wetbird/wetbird.htm**. The draft continental monitoring manual is available at **www.nacwcp.org/plan/rpt-monitoringmanual.pdf**.

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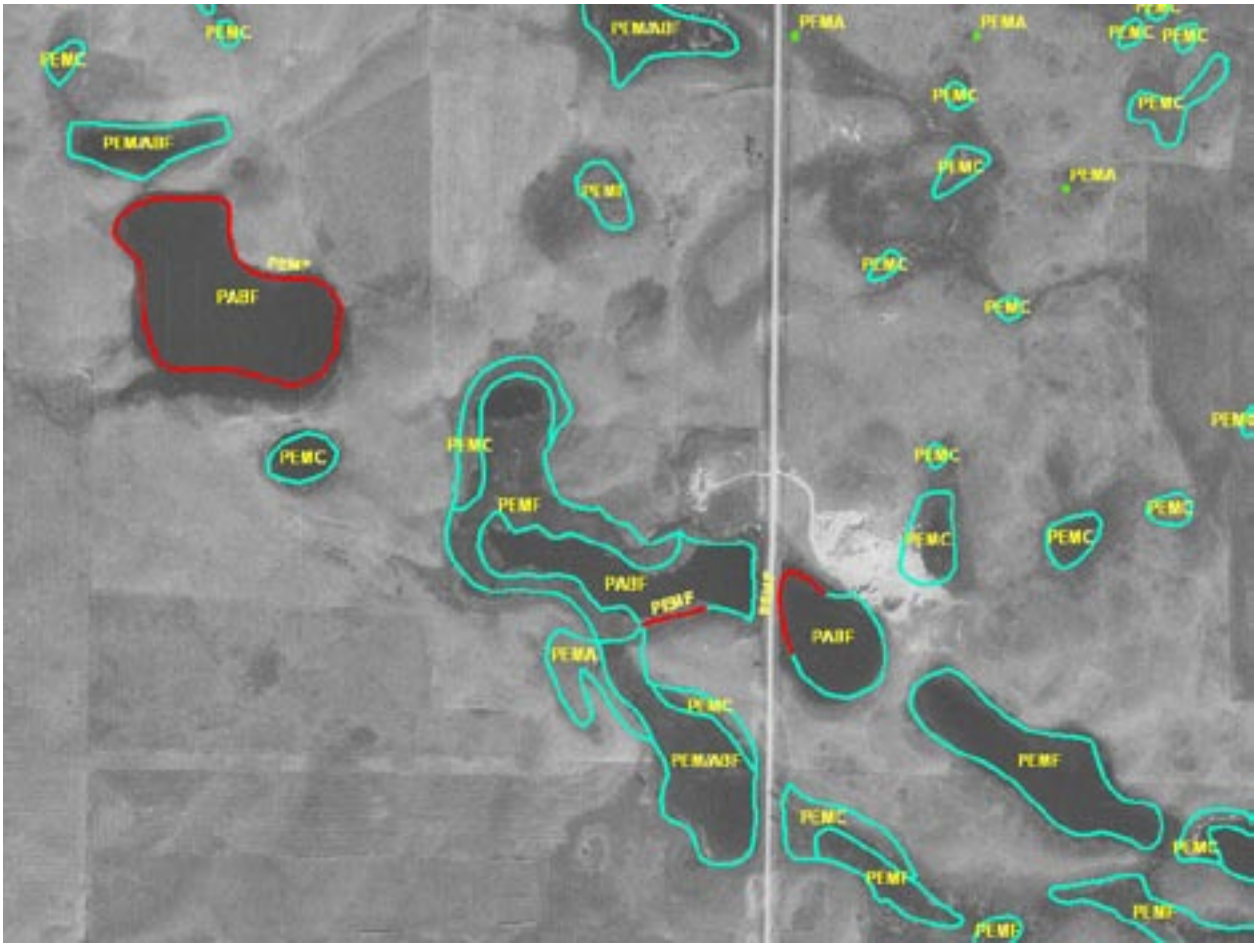
Figure H1. Example of digital National Wetlands Inventory (NWI) data overlaid on digital orthophoto. Labels are codes for system, class, and water regime of each wetland. Digital data allow easy determination of landscape metrics including wetland density, area, and variety over large geographic areas.



APPENDIX I. MANAGEMENT TOOLBOX FOR WATERBIRDS IN THE NORTHERN PRAIRIE & PARKLAND REGION

The scope and scale of waterbird management can differ greatly depending on conservation needs, local conditions, goals of management actions, and timing, duration, and location of management actions, among other factors. Listed below are common management practices for wetlands and uplands, as well as specialized management practices and government programs that can enhance waterbird habitat. Sources of additional information are listed in the web references and bibliography.

Management Practices for Wetlands

- Herbicides (typically glyphosate) are often applied to cattail-choked wetlands to thin stands of emergent vegetation and increase interspersion of open water to improve habitat quality for waterfowl and reduce populations of Red-winged Blackbirds. Known effects on waterbirds differ; species such as Black Tern, which prefer wetlands with a mixture of open water and emergent vegetation, typically increase following treatment with herbicide. Species that prefer wetlands with extensive amounts of emergent vegetation, such as Sora, typically decrease following treatment with herbicide. Alternative methods for thinning dense stands of emergent vegetation include burning, mowing, disking, excavating, and manipulating water levels.

- Grazing, which is primarily thought of as an upland treatment, can reduce emergent vegetation in and on the periphery of wetlands. Effects on waterbirds will vary depending on pre-treatment density of emergent vegetation and habitat preferences of target species, similar to response to thinning with herbicides.

- Water level manipulation can have positive or negative impacts on waterbirds, again depending on timing and other factors. Spring flooding of wetlands or wet meadows followed by a drawdown provides habitat for migrant shorebirds and duck pairs and provides moisture for hay or pasture, although waterbirds attracted to the site may be left without suitable habitat. However, fall flooding of impoundments with dense vegetation provides good cover for post-breeding rails. Many species of waterbirds and shorebirds select habitat in wetland complexes containing a diversity of water depths and vegetation. Water level management can be used to supplement existing wetland diversity, increasing the attractiveness of a site to waterbirds. Reservoirs are a feature of the prairie landscape and provide numerous nest sites for colonial waterbirds. Changing water levels in the reservoirs can create ecological traps for these species either by flooding nests or lowering water levels, which increases predator access to colonies that were formerly on islands.

- Fire is a natural process that was common in the NP&PR prior to settlement of the area by Europeans. Fire is typically confined to uplands, but depending on season and water availability, wetland vegetation also can be thinned and altered by fire. Timing of fire is important, as over-water nesters prefer and rely upon residual vegetative cover from the previous year's growth, and nests may be destroyed by spring burns.

- Constructed wetlands are increasingly common in the NP&PR. In many cases, constructed wetlands are built to provide water to livestock and wildlife benefits are

secondary. Many stock ponds are dug out of wet meadows or seeps and have steep sides and are relatively deep. These characteristics, combined with trampling by livestock, typically result in little or no emergent vegetation, which is required by many waterbirds. However, the deeper and more permanent water associated with stock ponds may increase wetland diversity in an area, allowing birds to persist where they might not have persisted otherwise. Stock ponds should be constructed to increase wildlife benefits and reduce potential liabilities. Maintaining complexes of wetlands of variable size, types, water depth, and cover types along with vegetated upland cover will provide habitat for a wide array of waterbird species. Non-agricultural or natural habitat surrounding wetlands provides for continuity of wetland complexes and reduces the risk of runoff from agricultural practices.

- In places where wetlands have been drained, wetland restoration is a viable management option. Restoring wetlands may be as simple as breaking a drain tile or plugging a ditch, and is often less expensive than creating wetlands. In addition, seeds from wetland plants may still be present and viable in the soil of restored wetlands. Many waterbird species use restored wetlands, and an increasing body of literature provides direction for managing restored wetlands to meet conservation goals.

Management Practices for Uplands

- Grazing reduces height and density of upland vegetation surrounding wetlands, which will negatively impact species that nest (e.g., American Bittern) or forage (e.g., Yellow Rail, Sora) in moist soil areas or dense vegetation. Decreased nesting success of Sandhill Cranes in grazed wetlands in southeastern Oregon was attributed to reduced vegetative cover, easy predator access, altered predator communities, and altered prey base associated with high cattle stocking rates.

  In dry conditions or seasons, cattle spend a disproportionate amount of time in wet meadows and around the perimeter of wetlands. Cattle use of wetlands can be reduced by placing shade structures, water tanks, mineral blocks, feed supplements, and oilers at least 400 m and preferably 800 m away from riparian areas. Proper timing can reduce the impact of grazing on wetlands. The impact of grazing will vary greatly among sites and even among years for a given site. Therefore, grazing practices must be flexible, incorporating local and regional land use, wetland type, precipitation, landscape patterns, stocking rate, type of animal stocked, and timing of grazing. In all situations, wetlands and surrounding range conditions should be monitored and appropriate changes made if water quality or quantity is altered by grazing practices.

- Road construction should minimize proximity of roads, road crossings, and road drainages to wetlands, particularly higher-quality wetlands or sensitive areas. Areas having high topographic relief or highly erodible soils should be avoided for road construction. Sufficient culverts and road crossings should be provided to handle runoff without causing erosion or damming flows. Buffer strips downslope of road construction and drainage will reduce runoff and encourage vegetation stabilization.

- Periodic burning of native uplands may reduce shrub growth, improve grassland vigor and regrowth, and reduce fuel hazards next around human development. Timing and water level likely affect vegetation response. Burns prior to April 15 will have the least

impact on current nesting, as fewer nests will be initiated. Sedges and wetland grasses (cool season) may be suppressed by spring burns. Burning may negatively impact soil organic layer depending on soil type, fire intensity, and fire duration, resulting in poor moisture retention and potential erosion. In some areas, prescribed burns may cause peat fires, which are difficult to extinguish and can dramatically change wetland characteristics. Fire may contribute to greenhouse gas emissions and result in decreased air quality. Also, fire may encourage growth of invasive weeds.

- Vegetative buffer strips surrounding wetlands are a major conservation treatment that can dramatically improve the quality of a wetland for wildlife. Vegetative buffer strips can reduce sediment, nutrient, and pollutant loads entering wetlands in addition to providing nesting and foraging cover for wildlife, but buffer strips are not a cure for poor land-management practices. Effectiveness of vegetative buffer strips varies with slope, topography, vegetation density, vegetation type, soil characteristics, subsurface drainage, upslope land use, and overland flow, so practices must fit local conditions.

- Agricultural practices can be altered to reduce their impacts on wetlands. Pesticides should not be applied over or adjacent to wetlands. Delaying cultivation and haying until after fledging also will reduce nest loss. Conservation tillage (no-till or minimum-till) can increase soil organic matter, reduce fuel use, reduce soil compaction, reduce soil erosion, and increase storage of soil moisture, although use of chemical pesticides to control weeds and insects might increase. Implementation of conservation tillage might require integrating new crop management practices, plant types, pest control methods, and socioeconomic principles. Silt traps also can be be excavated on the downslope end of fields to retain sediment.

- Buffer zones also can be required around development. Vegetated buffer strips function as horizontal runoff filters, reducing or stabilizing sediment, nutrient, and pollutant loads entering water bodies. Buffer zones also are used to reduce the impact of human disturbance and development on wildlife. Quality of runoff flowing into wetlands from urban areas can be improved by constructing retention ponds to trap and biologically incorporate pollutants. Filter fabric placed along the perimeter of construction sites and vegetative buffer strips next to roads can reduce flow of sediment into wetlands.

Specialized Management for Waterbirds

- Several waterbird species are susceptible to mortality from striking fences and utility lines. Mortality can be substantial in some cases, such as passes between wetlands, flight paths between roosting and foraging areas, and in the vicinity of staging areas. Mortality can be reduced by removing fences within or adjacent to wetlands, burying utility wires when possible, and adding markers to utility wires when burying is not feasible. Impacts of wind generation towers on waterbirds are poorly known, but towers should be placed away from areas of high waterbird numbers and waterbird flight paths.

- Populations of some waterbird species can be enhanced by management of nest sites. Damming of rivers has reduced flood-related scouring of banks and establishment of sandbars, with consequent loss of habitat for waterbird species that nest on bare riverine sandbars and islands. Vegetation can be removed from islands and nesting habitat improved by planned surges of water from dams, prescribed fire, and mechanical

methods such as chaining and cutting. Secure nesting habitat can be provided for loons by providing floating nesting platforms. Tree nesting species such as herons and Double-Crested Cormorants will readily use artificial nesting platforms placed on wooden poles in areas of suitable habitat. In all cases it is preferable to allow natural patterns of disturbance and succession to provide suitable habitat, but when natural processes are disrupted, specialized management can help local populations.

- In some cases, populations of waterbirds may be unnaturally high and population control may be necessary. Control should be biologically appropriate and follow legal guidelines. In many cases, problems associated with waterbirds can be eliminated by removing artificial sources of food, roost sites, or nest sites, or by providing alternative sites. In extreme situations, populations can be reduced by oiling or shaking eggs. In most cases, destruction of eggs is not as effective, as birds will renest.

- Predator management also can benefit waterbirds. Because of high costs, predator management is typically site-specific, such as around colonies or where human interference makes waterbirds unusually susceptible to predation (e.g., water drawdowns provide predator access to nests). Predator-proof fencing can keep mammalian predators away from colonies, but is expensive to install and maintain. Trapping and shooting of mammalian predators is also expensive, and provides relatively short-term benefits. Trapping or shooting of avian predators is restricted under federal, state, and provincial laws, but may be approved and permitted in some cases. Preferred alternatives for predator management include habitat management that increases security of waterbird nests and young and removal of cover, perches, and other features used by predators. Many common nest predators (e.g., skunks, raccoons, opossums, corvids) were uncommon in the pre-settlement NP&PR landscape and thrive in human-altered conditions. Removing culverts, trees, shelterbelts, rock piles, and old buildings that provide cover for predators will likely reduce impact of predators on local waterbird populations, as well as populations of grassland birds and shorebirds.

Wetland Habitat Conservation Programs

A variety of U.S. Government conservation programs are available in the NP&PR states through agencies such as the Fish and Wildlife Service (FWS), Natural Resources Conservation Service (NRCS), and Farm Service Agency (FSA). These programs are voluntary and provide varying levels of assistance depending on need, demand, location, term of signup, and local conditions, among other factors. Some programs are administered jointly with more than one partner agency.

- Partners for Fish and Wildlife (PFW): Partners for Fish and Wildlife offers technical and financial assistance to private landowners to voluntarily restore wetlands and other fish and wildlife habitats on their land. Examples of projects include, but are not limited to, restoring wetland hydrology by plugging drainage ditches, breaking tile drainage systems, installing water control structures, dike construction, and re-establishing old connections with waterways. Uplands can be improved by planting native grasslands and other vegetation and installing fencing and off-stream livestock watering facilities to allow for restoration of stream and riparian areas. See **partners.fws.gov** for more information.

- North American Wetland Conservation Act (NAWCA): this program specifically references goals of the NAWMP and provides a mechanism to support NAWMP objectives and those of other migratory bird recovery programs. NAWCA encourages partnerships to conserve North American wetland ecosystems for waterfowl, other migratory birds, fish, and wildlife. The act encourages the formation of public-private partnerships to develop and implement wetland conservation projects consistent with the North American Waterfowl Management Plan (NAWMP), a blueprint for continental waterfowl and wetlands conservation, and other North American migratory bird conservation agreements. The North American Wetlands Conservation Fund was established to help support projects through grants. A nine-member North American Wetlands Conservation Council reviews and recommends grant proposals to the Migratory Bird Conservation Commission for funding. See n**orthamerican.fws.gov/NAWCA/act.htm** for more information.

- Swampbuster: a provision of the Food Security Act of 1990 (a.k.a. the Farm Bill), "Swampbuster" denies federal agricultural benefits to farmers who drain wetlands, although wetlands can be farmed in dry years. Important as Swampbuster is to wetland-dependent wildlife, protection under the Swampbuster provision is temporary, and may be lost as new farm bill legislation is enacted. U.S. Department of Agriculture's Natural Resources Conservation Service will determine if a producer's land has areas subject to Swampbuster. The agency maintains a list of the plants and combinations of soils and plants found in wetlands and uses these technical tools, along with the hydrology of the area, to conduct determinations. These determinations stay in effect as long as the land is used for agricultural purposes (unless a violation occurs) or until the producer requests a review due to natural events. See **www.nrcs.usda.gov/PROGRAMS/wetlands** for more information.

- Wildlife Habitat Incentive Program (WHIP): this program offers technical assistance and cost sharing to private individuals, clubs, and organizations. WHIP provides cost-share payments up to 75% of project cost; agreements are for five- to 10-year periods. Pertinent projects include riparian area management, shallow water impoundment, and habitat education programs. See **www.nrcs.usda.gov/programs/whip** for more information.

- Environmental Quality Incentives Program (EQIP): this program promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement management practices on eligible cropland and rangeland. Pertinent projects include dams for livestock watering and sediment control, wetland buffers, fencing to protect buffers, and institution of minimum-till and no-till practices. See **www.nrcs.usda.gov/programs/eqip** for more information.

- Conservation Reserve Program (CRP): this program provides payments for farmers to plant long-term cover on highly erodible lands. This cover, typically grassland, provides numerous benefits to wildlife and water quality. The Prairie Pothole Region is a national priority area for CRP. The Farmable Wetland Program, a pilot program under CRP, provides payments to restore wetlands and associated buffers. Cost share is available to help with stand establishment and weed control. See **www.fsa.usda.gov/dafp/cepd/crp.htm** for more information.

- Conservation Reserve Enhancement Program (CREP): Related to CRP, CREP provides payments for providing cover for specific conservation practices; buffer strips along riparian areas are a priority. See **www.fsa.usda.gov/dafp/cepd/crep.htm** for more information.

- Wetlands Reserve Program (WRP): provides technical and financial support to help landowners protect, restore, and enhance wetlands on their property. A key element of this program is protection and enhancement of surrounding uplands, which reduces inputs of fertilizers, pesticides, and silt. Wetlands must be drained or degraded to be eligible; following acceptance into the program, wetlands must be restored and provide wildlife benefits. For more information, see **www.nrcs.usda.gov/programs/wrp**.

Waterbird Management Web Resources and Bibliography

A wealth of additional information on waterbirds, including searchable bibliographic databases, annotated bibliographies, and effects of management practices on waterbirds, is available at Northern Prairie's website **www.npwrc.usgs.gov/resource/literatr/wetbird/wetbird.htm**. Other information, including colony site management techniques, is available at **www.nacwcp.org/pubs**. A clearinghouse of information on sustainable agricultural practices, including information about conservation programs, is available at **attra.ncat.org**.

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