

Blueprint for Minnesota Bird Conservation

Recommendations for Minnesota's Prairie Hardwood Transition Region

Spring 2014



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An Implementation Blueprint for Minnesota Bird Conservation

Why is a Conservation Blueprint Needed?

Numerous national, regional, and state conservation plans that broadly address Minnesota birds and the landscapes they inhabit have been produced over the past 10-15 years. Most of these plans are strategic in nature, establishing very broad conservation and management goals. Although they compile and summarize important resource information, they rarely provide managers with specific, on-the-ground targets and management tools. Most plans also address such a large number of species that it can be challenging to know which species are the highest priorities, which species, if targeted, can provide the most conservation benefits for other species, and which species can be addressed most effectively.

This effort is designed to build on these previous planning initiatives, not replace them. The goal is to achieve a common bird conservation agenda for Minnesota conservation organizations, agencies, and citizens by creating one clear *operational blueprint that provides specific guidance for Minnesota bird conservation*. It builds upon existing efforts by: identifying the highest priorities in each ecological region using select conservation focal species; synthesizing the best proven conservation practices for each species; establishing measurable goals for species' population targets; and identifying key sites for conservation work in the next decade.

Designed to push conservation beyond broad habitat protection goals, the blueprint will enable everyone interested in the conservation of Minnesota's avifauna to assess whether we are implementing the correct actions to sustain these species as integral components of Minnesota's landscape for years to come.

Data Sources

A wealth of information is available about Minnesota birds, their distribution, breeding biology, population trends, and habitat requirements. Primary data sources used for Audubon's initiative included the Minnesota Ornithologists' Union, the North American Bird Conservation Initiative, Joint Ventures, the Minnesota Department of Natural Resources, National Audubon and the U.S. Geological Survey. A list of primary data sources can be found at the end of the plan. After reviewing these documents, data were placed into an Excel database designed to summarize relevant information on all Minnesota birds, including 314 regular species, 42 casual species and 78 accidental species. Over 640 fields of data were compiled and provided the basis for all subsequent analysis summarized in this document. Copies of the database are available upon request from Audubon Minnesota.

Blueprint's Organization

This document, a *Conservation Blueprint* for Minnesota's Prairie Hardwood Transition Bird Conservation Region, represents one four major products produced by Audubon's Conservation Blueprint:

1. A Brochure on Minnesota's Stewardship Species;
2. Species Accounts for 78 Priority Species;
3. Conservation Blueprints for nine Target Conservation Species; and
4. Conservation Blueprints for Minnesota's four Bird Conservation Regions

The Blueprint for the Prairie Hardwood Transition Region is not written like a typical planning document. Instead, it is designed to provide key information and tools that addresses three primary questions:

1. Which birds are we going to focus on?
2. How are we going to protect these species?
3. Where are we going to work?

Information is provided primarily in tables, brief descriptions about how priorities were selected and short vignettes that summarize species priorities and goals. The Blueprint includes the following:

- An descriptive overview of the region including its avifauna, landscape features, and management issues and opportunities;
- A list of Highest, High and Moderate Priority birds in the region;
- Identification of Target Conservation Species in the region;
- Identification of Stewardship Species that should be primary targets in the region;
- Assessment of the monitoring efforts currently underway for the highest priority species and recommendations for future monitoring;
- Identification of priority habitats on which to focus conservation actions;
- Identification of habitat protection and restoration goals in the region;
- Identification of habitat management considerations for the highest priority species; and
- Identification of Important Bird Areas that are a target for future work by Audubon and its conservation partners.

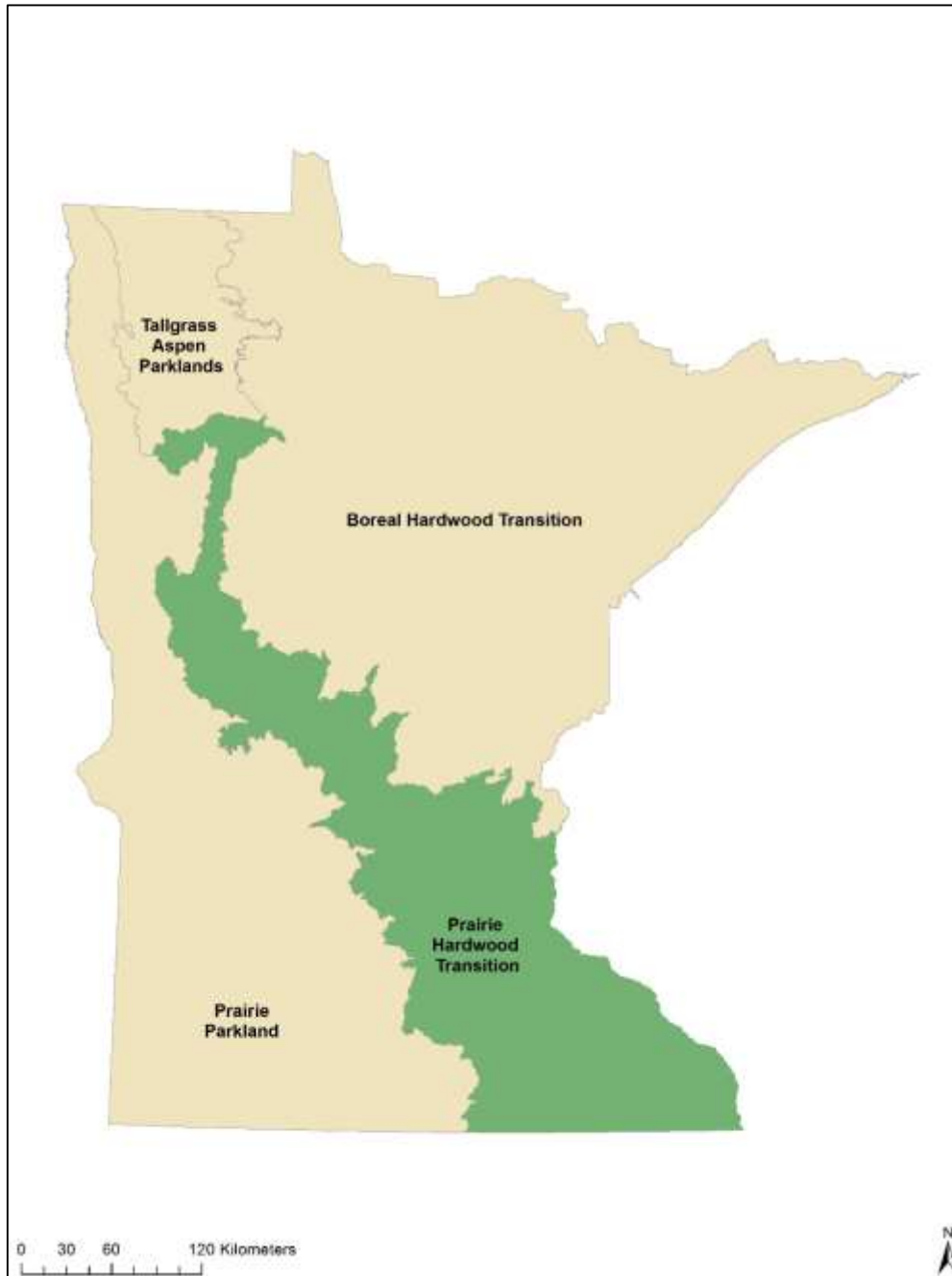
More detailed information on those species that were selected as Target Conservation Species is provided in conservation blueprints for each species. An Executive Summary also provides an overall description of the entire Implementation Blueprint. All these documents are available on the Audubon Minnesota website (mn.audubon.org).

The Prairie Hardwood Transition Region

Administrative Boundaries and Issues

The boundary of Audubon Minnesota's Prairie Hardwood Transition Region corresponds to the Ecological Classification System boundary for the Eastern Broadleaf Forest Province in Minnesota (*Minnesota Department of Natural Resources 2005*) (Figure 1).

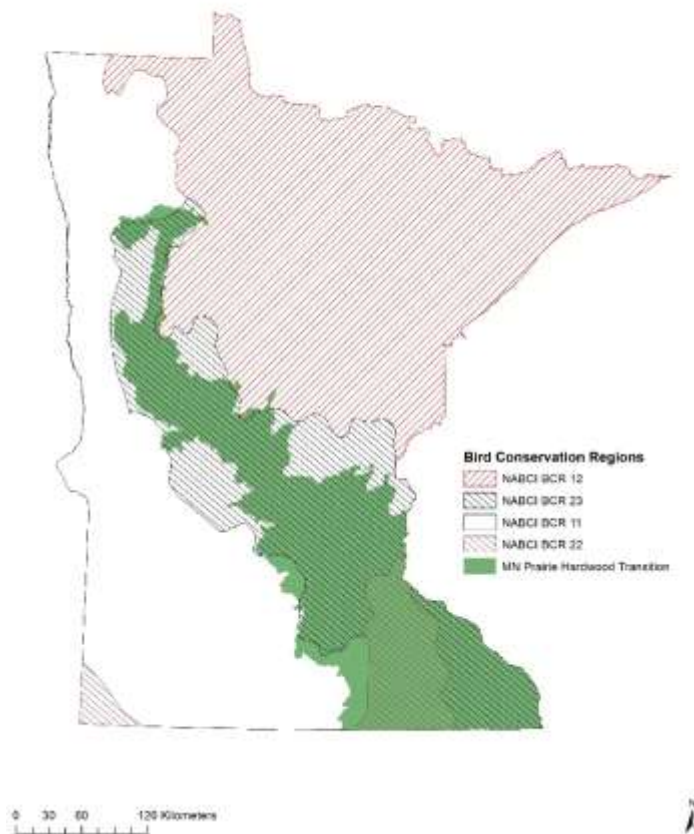
Figure 1. Audubon Minnesota’s Prairie Hardwood Transition Region from Minnesota’s Ecological Classification System



Nearly all the quantitative data for this document originate from an assortment of plans developed by partners working under the umbrella of the North American Bird Conservation Initiative (NABCI) (see Selected Resources). Specifically this includes the U.S. Shorebird Conservation Plan, the North American Waterfowl Management Plan, the North American Waterbird Conservation Plan and Partners in Flight, also known as the North American Landbird Conservation Plan. Minnesota also includes portions of two Joint Ventures, the Prairie Potholes and the Upper Mississippi River/Great Lakes. Each Joint Venture also has prepared conservation plans for waterfowl, waterbirds, landbirds and shorebirds and these documents were integral to Audubon’s *Conservation Blueprint*.

For planning purposes, NABCI delineated bird conservation regions using the Commission for Environmental Cooperation’s (1997) hierarchical framework of nested ecological regions. Although the boundaries are very similar to the boundaries that have been delineated for Minnesota’s native vegetation, they are not identical. The NABCI region that most closely corresponds with the Prairie Hardwood Transition Region in Minnesota is Bird Conservation Region (BCR) 23, also referred to as the Prairie Hardwood Transition Region, and the southeast section of Bird Conservation Region 22, the Eastern Tallgrass Prairie (Figure 2). The major difference between BCR23 and Audubon’s Prairie Hardwood Transition Region (shown in Figure 1) is that the latter is more narrowly constricted north of the Twin Cities Metropolitan Region and it includes the entire southeastern corner of BCR22, the Eastern Tallgrass Prairie.

Figure 2. NABCI Boundaries for the Prairie Hardwood Transition BCR compared to the boundaries of Audubon Minnesota’s Prairie Hardwood Transition Region



Before deciding on the final boundaries of Audubon’s Prairie Hardwood Transition Region we conducted an analysis of birds that occur in that portion of BCR22 that extends into southeastern Minnesota and clarified that the avifauna was identical to that within BCR23, justifying combining the two BCRs for the purposes of the *Conservation Blueprint*. Furthermore, because Minnesota’s Ecological Classification System boundaries have become a standard reference for land managers throughout the state, Minnesota’s Conservation Blueprint adopts those boundaries. The boundary of Audubon Minnesota’s Prairie Hardwood Transition Region is similar enough to the NABCI boundaries of BCR23, combined with the southeastern tip of BCR22, to allow a reasonable extension of the NABCI data for BCR23 to all of the Prairie Hardwood Transition Region.

Vegetation/Landscape Features

The Prairie Hardwood Transition Region is broadly described as the transition zone or ecotone between the Boreal Hardwood Transition Region to the northeast and the Prairie Parkland Region to the west. Much of the region's original vegetation has been converted to agriculture (53% row crop and 18% pasture) and urban/industrial (5%). Detailed descriptions of the province and subsections can be found in "A Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province" (*Minnesota Department of Natural Resources 2005*) and in "Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife" (*Minnesota Department of Natural Resources 2006*). Because a major feature of this region is the Twin Cities metropolitan area, a separate *The Guide to Urban Bird Conservation for the Twin Cities and Surrounding Area* (*Audubon Minnesota 2012*) has been prepared to address the region's unique bird conservation issues and to serve as a catalyst for more comprehensive and strategic action. The Guide was prepared with funding support from the U.S. Fish and Wildlife Service, Midwest Region.

Bird Community

The Prairie Hardwood Transition Region of Minnesota supports 149 regular breeding species and 26 permanent residents and over 100 species that do not breed in the region but depend on critical habitats for migration. The 175 regular nesting species are fairly equally distributed among five major habitat types (Figure 3), depicting the transitional nature of this region between the Boreal Hardwood Transition Region to the north and the Prairie Parkland Region to the west.

Data from a variety of sources, including the federal Breeding Bird Survey (*Sauer et al. 2014*), the North American Bird Conservation Initiative (see Selected Resources) and the Minnesota Waterfowl Survey (*Dexter 2012*), were used to assess the population trend of all breeding species specifically within the Prairie Hardwood Transition Region (i.e. not their statewide trend). Status trend assessments are summarized below in Figure 4. Population trends for birds in each major habitat are further depicted in Figure 5.

Figure 3. Number and Percentage of Breeding and Permanent Resident Birds in Major Habitats of the Prairie Hardwood Transition Region

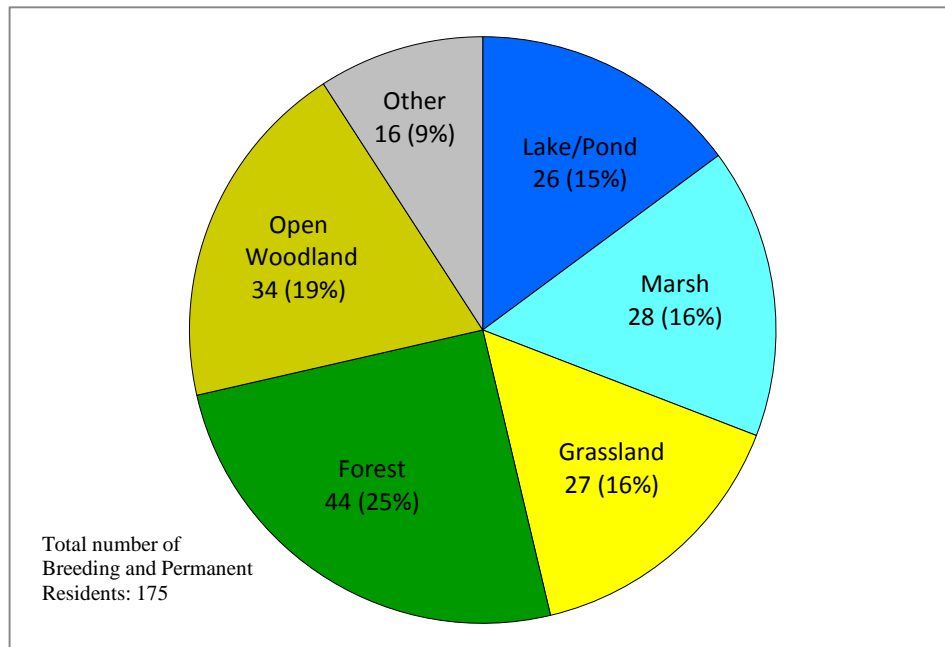


Figure 4. Population Trends of Breeding Birds and Permanent Residents in the Prairie Hardwood Region

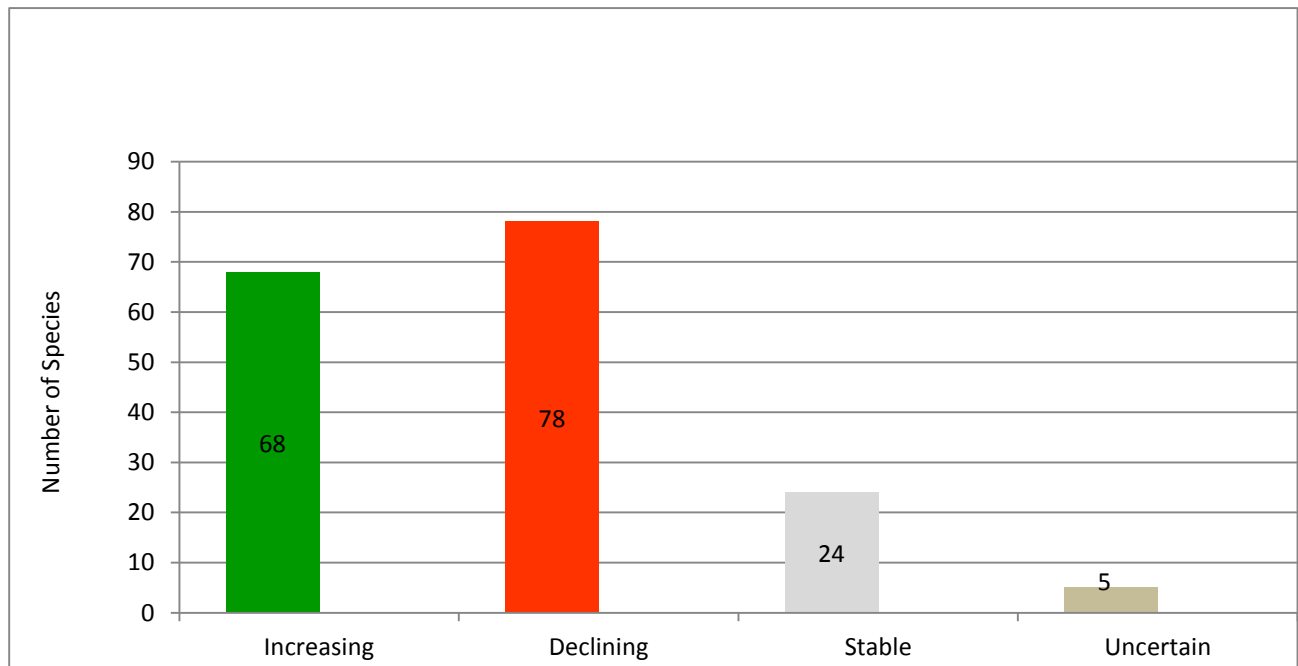
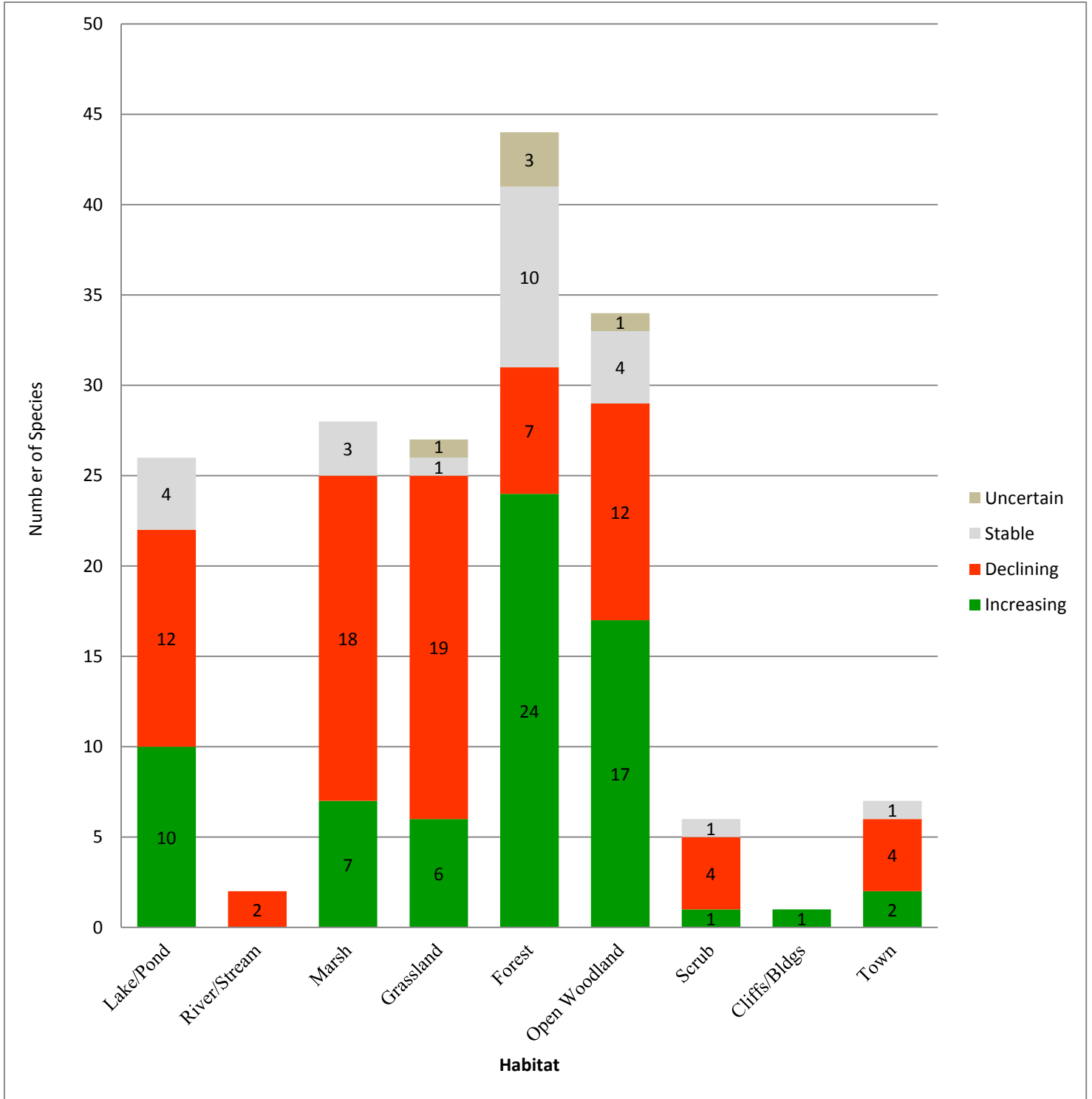


Figure 5. Population Trends of Breeding Birds and Permanent Residents in the Prairie Hardwood Transition Region by Major Habitat



Management Issues/Opportunities

Prior to European settlement the Prairie Hardwood Transition Region was a matrix of floodplain forests and upland maple-basswood forests, mesic prairie, and oak savannas and woodlands. Interlaced among these vegetative communities was a rich diversity of wetlands, lakes and rivers, including the confluence of three major rivers, the Mississippi, Minnesota and St. Croix. Unlike Minnesota's Prairie Parkland Region to the west, some of the original character of this landscape remains today, particularly further north in the region known as the Hardwood Hills and in the extreme southeastern Blufflands region. Much of the landscape, however, has been converted to row crops and hayfields. Only small remnants of oak savanna and native prairie are left and the remaining forest cover (12%) has been fragmented by urban, rural, and industrial development and agriculture. The water quality of many of the aquatic communities in the province has been impeded by agricultural runoff and both industrial and urban development. Invasive species have become a major conservation threat in the province as they further degrade already comprised terrestrial and aquatic systems.

The most notable bird that has disappeared from this landscape is the Passenger Pigeon. Dependent on mast crops of oaks, beechnuts and chestnuts as well as other seeds and berries, the pigeon nested in vast colonies that moved from year to year and even within the nesting season. Some of these large colonies nested in the oak woodlands of Wabasha and Goodhue County in southeastern Minnesota. Overexploitation by hunters was one of the primary reasons for the species demise. Other forest birds that are now well-known components of Minnesota's avifauna, such as the Chestnut-sided Warbler, Nashville Warbler, and Golden-winged Warbler, were originally much more common in the deciduous forests of southern Minnesota than they were in northern Minnesota. Species of young or mid-successional forests, these species originally found suitable habitat in the more open woodlands of the Prairie Hardwood Transition Region; the dense coniferous forests of pine, spruce and fir that covered much of northern Minnesota were not used. However, as agriculture and development changed the southern forest landscape, and the northern old-growth forests were logged, creating a landscape dominated by younger aspen-birch forests, the birds shifted their ranges north and now rarely occur in the Prairie Hardwood Transition Region.

The Mississippi River remains one of the most prominent features of the landscape and continues to serve as a migration highway for 326 bird species (60% of North American birds and 40% of its waterfowl). The river and its wide floodplain corridor is also an entry point for many deciduous forest species from states further south as they expand their ranges northward, including such species as the Hooded Warbler, Kentucky Warbler and Tufted Titmouse.

Change will continue at a rapid pace in the Prairie Hardwood Transition Region, home to Minnesota's three largest metropolitan areas: the Twin Cities, Rochester and St. Cloud. The largest population growth in Minnesota in the coming decades is projected for the Twin Cities region, particularly suburban and semirural areas beyond the suburbs but still within commuting range of the Twin Cities. Large increases are also projected for Rochester and St. Cloud. By 2020, nearly 70% of Minnesotans will live in one of these three metropolitan areas, including their suburban and exurban areas. As the region grows, patterns of landownership are also changing. Large tracts of agricultural and undeveloped land are often subdivided for residential use while, within the agricultural community, there is a trend toward increased size and consolidation of the remaining commercial agricultural operations.

This rapid development will place even greater stress on the remaining forests, grasslands, wetlands, lakes and rivers and the community of birds dependent on them. Landscape planning initiatives that have already been underway, as well as a host of existing conservation programs will provide opportunities to try to balance natural resource conservation and growth. The amount of publicly owned land in the region is small compared to that found further north. As a result, conservation gains for all wildlife, including birds, will need to have the support of private land owners. Some important conservation opportunities that benefit birds in the province are briefly summarized below.

Urban Landscapes

- ***Urban Bird Treaty Program for Migratory Birds***

The United States Fish and Wildlife Service created this program in 1999 to help municipal governments conserve birds that live or nest in, or overwinter or migrate through, their cities. On July 14, 2011, the cities of Minneapolis and St. Paul were jointly recognized as a member of the Urban Bird Treaty Program and are one of only 19 treaty cities throughout the nation.

As part of the Urban Bird Treaty, the Twin Cities was challenged to further urban bird conservation. Funds supported the development of *The Guide to Urban Bird Conservation in the Twin Cities and Surrounding Area* (<http://mn.audubon.org/twin-cities-bird-conservation>). Completed in 2012, the guide details how the Twin Cities and surrounding areas can work to protect restore and enhance urban/suburban areas for birds through targeted habitat restoration, species management, environmental education, and community involvement activities. Funds are also being directed at restoring key habitats in the urban core.

Forest Landscapes

- ***Driftless Area Initiative***

The Driftless Area is the region of the Upper Mississippi River Basin that was not covered by ice during the last glaciation. Defined by its deeply carved river valleys, that were not covered by deep layers of till left behind by retreating glaciers, the region encompasses portions of southeastern Minnesota as well as portions of Wisconsin, Iowa and Illinois. The mission of the Driftless Area Initiative is to unite organizations and individuals within the area for collaborative action to enhance and restore this region's ecology, economy, and cultural resources in a balanced, integrated fashion. One important aspect of the Initiative is its focus on increasing and promoting forest habitat for neotropical migratory birds.

- ***Minnesota Department of Natural Resources (DNR), Subsection Forest Resource Management Planning***
Since 2000, the DNR has been developing vegetation management plans for forestland under its administrative control using the subsection level of the Ecological Classification System (ECS) to define the boundaries of the base planning units. These Subsection Forest Resource Management Plans (SFRMPs) establish forest management direction for land administered primarily by the Divisions of Forestry and Fish and Wildlife that are considered available for forest management activities.

Plans have been developed for four ECS subsections in the Prairie Hardwood Transition Region: the Anoka Sandplain Subsection, the Hardwood Hills Subsection, and the Blufflands and Rochester Plateau Subsections (the latter two were combined into one plan). Together these three subsection plans address state management of 185, 937 forest acres. The habitat needs of forest birds are included in the development of these plans which are updated regularly.

- ***Minnesota Forest Resources Council Landscape Planning Efforts***

The 1995 Minnesota Sustainable Forest Resources Act laid the foundation for large-scale forest management by establishing the Landscape Program. Designed to build a collaborative approach to sustainable forest management on all land ownerships, both public and private, the Minnesota Forest Resources Council is responsible for the Program. The primary means of program implementation is the establishment of regional committees to solicit the ideas of all members of the community who are interested in forest resources in a specific forest landscape. The objective is to have the regional committees collectively identify, discuss, and resolve important, locally-based, forest resource management issues. The council has delineated six regional forest landscapes and citizen committees are active in each. Two of the landscapes fully encompass portions of the Prairie Hardwood Transition Region: the Southeast Landscape and the West Central Landscape; smaller portions of the province are also included in the East Central Landscape and the North Central Landscape. The conservation needs of forest wildlife, including birds, are among the resource issues addressed by each committee.

Prairie Landscapes

- ***The Prairie Enthusiasts***

The vast majority of Minnesota's native prairie occurred further west in the Prairie Parkland Region and most of the conservation focus on prairie protection and restoration is directed at this region. Nevertheless, upland prairie was part of the Prairie Hardwood Transition Region and small remnants are still present today. A private organization, the Prairie Enthusiasts, is dedicated to the preservation and restoration of prairies and savannas in the Upper Midwest. Two chapters cover portions of southern Minnesota and the St. Croix Valley of both Wisconsin and Minnesota.

- ***Grassland and Wetland Conservation Programs***

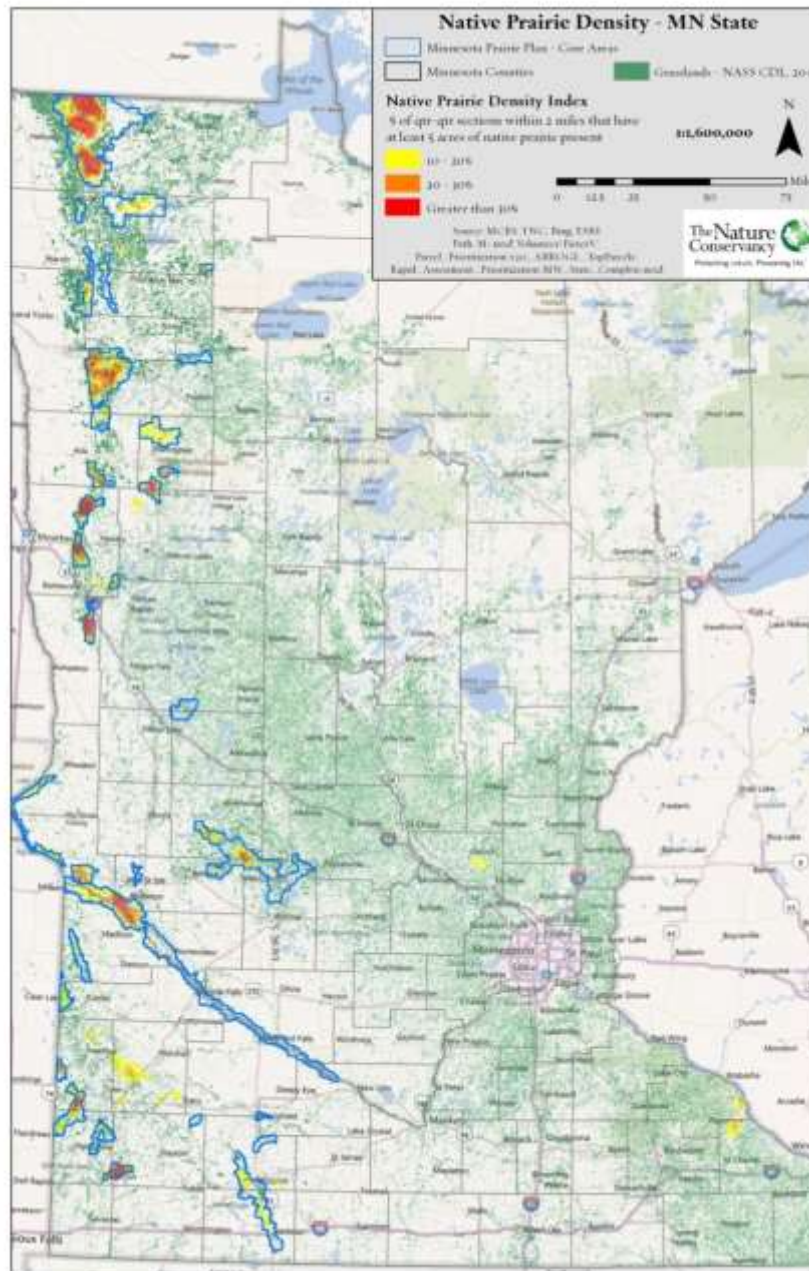
The Minnesota Department of Natural Resources Wildlife Management Area Program, begun in 1951 as the "Save the Wetlands" initiative, has focused on the preservation of Minnesota's disappearing wetlands and adjacent grasslands. The program has grown to protect over 1.3 million acres of habitat in 1,440 Wildlife Management Areas (WMAs) across the state. Critical to the state's waterfowl population, these sites also provide essential habitat to shorebirds, waterbirds and grassland songbirds.

The WMA Program has been complemented by myriad other state and federal grassland and wetland conservation programs, including the Reinvest in Minnesota (RIM) Reserve Program, the Conservation Reserve Program (CRP), the Conservation Reserve Enhancement Program (CREP), the Wetland Reserve Program (WRP), the Grassland Reserve Program (GRP) and many others. Although all these efforts have made tremendous strides in protecting and restoring critical grasslands and wetlands throughout the region, there remain significant challenges.

Commodity prices, land prices or changes in the Farm Bill can influence a farmer's decision to put land aside in conservation programs or to plow grasslands under for corn and soybeans. Unfortunately, in recent years the high commodity prices have led farmers to put as much land into production as possible. As a result, the state has lost 400,000 CRP acres from 2007 to 2012, thereby eliminating habitat for many grassland species (*McDonald 2013*); in 2007 a total of 1.8 million CRP acres existed in the state. The loss of CRP acres is considered the biggest threat to grassland bird conservation throughout the Midwest and Great Plains. Fewer dollars also are available for conservation programs in lieu of federal budget cuts. Grasshopper Sparrows and Western Meadowlarks are not likely to benefit from these economic realities.

Nevertheless, the opportunities that remain in the Prairie Hardwood Transition Region for grassland conservation are significant as evidenced by Figure 6, which illustrates the distribution and density of grass cover in Minnesota in 2011. Produced by The Nature Conservancy, the map targets the importance of this region in protecting grassland birds. The largest extent of grassland cover (i.e. surrogate grasslands, not native prairie; shown in green on the map) in Minnesota is not in the Prairie Parkland Province to the west but in the Prairie Hardwood Transition Region.

Figure 6. Native Prairie Density and Grassland Cover in Minnesota, Minnesota Nature Conservancy



- ***Shoreline Restoration Programs***

Lakes and rivers are another important component of the landscape in the Prairie Hardwood Transition Region. The shorelines of these waters are historically a rich environment for a diversity of birds, including herons, egrets, grebes, rails, ducks and an array of songbirds. Because people are equally attracted to these shorelines for recreation and housing, increasing development pressure has eroded their value to wildlife and contributed to a host of additional challenges including degraded water quality, increased prevalence of

invasive species and eroding shorelines. In recent years more attention is being directed at the need to protect “the water’s edge.” More dollars are being directed at the acquisition of Aquatic Management Areas which target the protection and restoration of lakeshores to improve and protect water quality and create wildlife habitat. The Minnesota Department of Natural Resources, Board of Soil and Water Resources, county and city governments, and lake associations have all been engaged in programs to restore valuable shoreline habitats.

What Birds are we going to focus on?
Priority Breeding Species

Identification of Priority Breeding Species

The purpose of the following table is to provide resource professionals with a rank order of breeding species priorities in the Prairie Hardwood Transition Region. It does not include **all** breeding bird species that are declining but rather focuses on those that have experienced significant declines in the region, are dependent on vulnerable habitat, and have been recognized as priorities by various resource agencies (see Appendix 1 for details on selection of priority species). Because the number of species in each category is still relatively large, and the purpose of this document is to be strategic about identifying a small number of species that should be the focus of conservation efforts in the short term, this plan goes further in identifying a select number of Target Conservation Species (shown in red). The process for selecting these species is summarized in Appendix 2.

Table 1. Priority Breeding Species in the Prairie Hardwood Transition Region

Breeding Bird Species Priorities for the Prairie Hardwood Transition Region			
Very Rare	Highest Level: I	High Level: II	Moderate Level: III
Green-winged Teal	Pied-billed Grebe	Black-crowned Night-Heron ^{1,3}	Trumpeter Swan ^{1,2}
Clark's Grebe	American Bittern ¹	Sora	Wood Duck ³
King Rail ^{1,2}	Least Bittern ¹	Common Moorhen ^{1,2}	Mallard ³
Yellow-crowned Night-Heron	Red-headed Woodpecker ^{1,3}	Upland Sandpiper ^{1,3}	Blue-winged Teal ³
Tufted Titmouse	Loggerhead Shrike ^{1,2}	American Woodcock ^{1,3}	Northern Pintail ¹
Hooded Warbler ^{1,2}	Marsh Wren ¹	Wilson's Phalarope ^{1,2,3}	Redhead
	Veery ^{1,3}	Black Tern ^{1,3}	Northern Harrier ¹
	Brown Thrasher ¹	Black-billed Cuckoo ¹	American Kestrel
	Golden-winged Warbler ¹	Eastern Whip-poor-will ^{1,3}	American Coot
	Cerulean Warbler ^{1,2,3}	Acadian Flycatcher ^{1,2}	Spotted Sandpiper
	Henslow's Sparrow ^{1,2,3}	Willow Flycatcher ^{1,3}	Wilson's Snipe ³
	Bobolink ¹	Bell's Vireo ^{1,2}	Forster's Tern ^{1,2}
	Eastern Meadowlark ^{1,3}	Warbling Vireo	Chimney Swift ³
	Western Meadowlark	Louisiana Waterthrush ^{1,2,3}	Belted Kingfisher
	Yellow-headed Blackbird	Field Sparrow ¹	Northern Flicker
		Vesper Sparrow	Least Flycatcher ¹
		Lark Sparrow	Western Kingbird
		Grasshopper Sparrow ¹	Eastern Kingbird
		Dickcissel ¹	Purple Martin
			N. Rough-winged Swallow ¹
			Wood Thrush ^{1,3}
			Blue-winged Warbler ^{1,3}
			Prothonotary Warbler ^{1,3}
			Clay-colored Sparrow
			Savannah Sparrow

Note: Species in bold **Red** are Target Conservation Species in the Prairie Hardwood Transition Region (see Appendix 2).

*Details about how these species were identified as priority species can be found in Appendix 1.

¹ Minnesota Species in Greatest Conservation Need (*Minnesota Department of Natural Resources 2006*).

² Minnesota State Listed Species (*Minnesota Administrative Rules, Chapter. 6134.0200, Subpart 2(B)*).

³ Upper Mississippi Valley/Great Lakes Joint Venture Region Focal Species (<http://uppermissgreatlakesjv.org/docs/JV2007All-BirdPlanFinal2-11-08.pdf>).

Target Conservation Breeding Species

Identification of Target Conservation Species in the Prairie Hardwood Transition Region

Species that Audubon Minnesota will highlight as Target Conservation Species in the Prairie Hardwood Transition Region depend on the following key habitats: shallow lakes, rivers: headwaters to large; rivers: very large; oak savanna/brush prairie; forest uplands: hardwood; forest uplands: aspen-oak; native prairies and grasslands; and non-forested wetlands.

- ❖ **Forster’s Tern:** The Forster’s Tern is a Target Conservation species for the **Shallow Lake** aquatic community. Protecting its habitat may also provide suitable habitat for the following species: Trumpeter Swan, Northern Pintail, Least Bittern, Black-crowned Night-Heron, Common Moorhen, American Coot, Wilson’s Phalarope, and Black Tern.
- ❖ **Red-headed Woodpecker:** The Red-headed Woodpecker is a Target Conservation Species for the **Oak Savanna/Brush Prairie** community. Protecting its habitat also may provide suitable habitat for the following species:

American Woodcock	Western Kingbird	Blue-winged Warbler
Northern Harrier	Eastern Kingbird	Field Sparrow
Black-billed Cuckoo	Loggerhead Shrike	Lark Sparrow
Northern Flicker	Bell’s Vireo	
Willow Flycatcher	Brown Thrasher	

- ❖ **Wood Thrush*:** The Wood Thrush is a Target Conservation Species for both the **Forest Upland Aspen-Oak** and **Forest Upland Hardwood** communities. Protecting its habitat also may provide suitable habitat for the following species: American Woodcock, Eastern Whip-poor-will, Red-headed Woodpecker, Northern Flicker, Acadian Flycatcher, Least Flycatcher, Veery, Blue-wined Warbler and Golden-winged Warbler.
- ❖ **Louisiana Waterthrush*:** The Louisiana Waterthrush is a Target Conservation Species for the **River: Headwater to Large** aquatic community. Protecting its habitat may also provide suitable habitat for the Belted Kingfisher and Northern Rough-winged Swallow.
- ❖ **Prothonotary Warbler*:** The Prothonotary Warbler is a Target Conservation Species for the **Rivers: Very Large** community. Protecting its habitat may also provide suitable habitat for the Black-crowned Night-heron, Wood Duck, Belted Kingfisher and Northern Rough-winged Swallow.
- ❖ **Cerulean Warbler*:** The Cerulean Warbler is a Target Conservation Species for the **Forest Upland-Hardwood** community. Protecting its habitat may also provide suitable habitat for the following species: Red-headed Woodpecker, Northern Flicker, Acadian Flycatcher, Least Flycatcher, Veery, Wood Thrush and Blue-winged Warbler.
- ❖ **Eastern Meadowlark*:** The Eastern Meadowlark is a Target Conservation Species for the **Prairie/Grassland** open landscape community. Protecting its habitat may also provide suitable habitat for the following species:

American Bittern	Western Kingbird	Lark Sparrow	Bobolink
Northern Harrier	Eastern Kingbird	Grasshopper Sparrow	Western Meadowlark
Upland Sandpiper	Loggerhead Shrike	Henslow’s Sparrow	
Wilson’s Snipe	Field Sparrow	Dickcissel	

- ❖ **Yellow-headed Blackbird***: The Yellow-headed Blackbird is a Target Conservation species for the **Wetland: Nonforested** open landscape community. Protecting its habitat may also provide suitable habitat for the following species:

Trumpeter Swan	Redhead	Northern Harrier	Wilson’s Phalarope
Wood Duck	Pied-billed Grebe	Sora	Black Tern
Mallard	American Bittern	Common Moorhen	Forster’s Tern
Blue-winged Teal	Least Bittern	American Coot	Belted Kingfisher
Northern Pintail	Black-crowned Night-Heron	Wilson’s Snipe	Willow Flycatcher

*These species also have been selected as focal species by the Upper Mississippi Valley/Great Lakes Joint Venture

Minnesota Goals for Target Conservation Species in the Prairie Hardwood Transition Region

A brief background is provided only for those species for which a detailed conservation blueprint has **not** been prepared. The detailed blueprints were developed for conversation target species that are categorized as the Highest Priority.

1. Forster’s Tern

Minnesota Goal: Increase population levels by 10% by protecting non-forested wetlands and shallow lakes and supporting implementation of the Minnesota Department of Natural Resources Shallow Lake Management Plan (*Minnesota Department of Natural Resources 2010*).

Minnesota Objective: Assess current population level statewide, followed by monitoring large colonies in Minnesota where Forster’s Terns occur regularly, every 3-5 years.

Background: In the late 1980s, the statewide population of Forster’s Terns in Minnesota was estimated at 900-1,000 breeding pairs. A more recent population estimate is not available. The Upper Mississippi Valley/Great Lakes (UMVGL) Joint Venture Waterbird Conservation Plan estimates that the Minnesota portion of the JV can support an additional 100 pairs, or an approximate increase of 10%. Populations occur throughout the southern region of the UMGVL Joint Venture Region as well as in the Prairie Pothole Joint Venture Region.

2. Red-headed Woodpecker

Minnesota Goal: Maintain a statewide population of Red-headed Woodpeckers of at least 40,000 birds through effective and efficient habitat conservation of Minnesota’s endangered oak savanna habitat and support the Audubon Chapter of Minneapolis’s Red-headed Woodpecker Recovery Project (<http://www.RedheadRecovery.org>).

Minnesota Objective: Initiate conservation actions designed to halt the decline of Minnesota’s Red-headed Woodpecker population and monitor the effectiveness of those actions by increasing the population annually by an average of 2.5% per year over a 30 year period.

Background: Detailed information is available in the Implementation Conservation Blueprint for the Red-headed Woodpecker.

3. Wood Thrush

Minnesota Conservation Goal: Eliminate the state population deficit (48,320 birds) over a 15 year period through effective and efficient habitat conservation.

Minnesota Conservation Objective: Protect a total of 736 km² of habitat in the Upper Mississippi Valley/Great Lakes (UMVGL) Joint Venture region of Minnesota (510 km² in BCR12, 6 km² in BCR22 and

220 km² in BCR23) and restore a total of 373 km² of habitat in the UMVGL JV region of Minnesota (260 km² in BCR12, 3 km² in BCR22 and 110 km² in BCR23) at multiple sites within the current breeding range of the Wood Thrush.

Background: Minnesota's population is currently estimated at 75,000 individuals (22,630 in the Prairie Hardwood Transition Region); the target population is 110,000 (33,950 in the Prairie Hardwood Transition). The population and habitat goals are from the Upper Mississippi Valley/Great Lakes Landbird Conservation Plan.

4. **Cerulean Warbler**

Minnesota Conservation Goal: Accurately assess current population levels in Minnesota and delineate conservation actions to increase the population by 100% to attain a population level of at least 1,000 individuals.

Minnesota Conservation Objective: Initiate conservation actions designed to halt the decline of Minnesota's Cerulean Warbler population and monitor the effectiveness of those actions by increasing the population annually by an average of 2.5% per year over a 30 year period.

Background: Detailed information is available in the Implementation Conservation Blueprint for the Cerulean Warbler.

5. **Prothonotary Warbler**

Minnesota Conservation Goal: Assess current population levels and protect and restore large tracts of floodplain forest in southeastern and east-central Minnesota.

Minnesota Conservation Objective: Eliminate the current population deficit in the Upper Mississippi Valley/Great Lakes Joint Venture region by achieving a 50% population increase or an average annual increase of 3% over a 15 year period.

Background: Because the Prothonotary Warbler is not detected by the federal Breeding Bird Survey in Minnesota, the Upper Mississippi Valley/Great Lakes Joint Venture does not provide specific habitat protection and restoration goals for the species in Minnesota.

6. **Louisiana Waterthrush**

Minnesota Conservation Goal: Maintain current population levels by protecting key habitat areas, continuing to protect stream riparian zones, and maintaining water quality.

Minnesota Conservation Objective: Assess current population levels and investigate the best manner for regularly monitoring the species population status in Minnesota.

Background: Because of its streamside habitat requirements, the Louisiana Waterthrush is not adequately monitored by the roadside Breeding Bird Survey. Although the Minnesota County Biological Survey provided a reasonable assessment of the species current distribution in the state, little is known about population trends. In addition to assessing its population in key habitat areas in Minnesota, protection of streams and their riparian habitat is essential. The Louisiana Waterthrush is on the northern edge of its range in Minnesota. As a result, the Upper Mississippi Valley/Great Lakes Joint Venture does not provide specific goals for habitat protection and restoration in the state.

7. **Yellow-headed Blackbird**

Minnesota Conservation Goal: Halt the decline of Minnesota’s Yellow-headed Blackbird population and increase it by 100% to approximately 600,000 individuals.

Minnesota Conservation Objective: Implement conservation actions that increase Yellow-headed Blackbird population levels in Minnesota an average of 2.5% per year over 30 years.

Background: Detailed information is available in the Implementation Conservation Blueprint for the Yellow-headed Blackbird.

8. **Eastern Meadowlark**

Minnesota Conservation Goal: Increase current populations in Minnesota by 100%, aiming for a statewide population of at least 140,000 individuals.

Minnesota Conservation Objective: Initiate conservation actions designed to stop the decline of Minnesota’s Eastern Meadowlark population and work to increase it approximately 2.5% per year as monitored by the Federal Breeding Bird Survey in Minnesota in the next 30 years.

Background: Detailed information is available in the Implementation Conservation Blueprint for the Eastern Meadowlark.

Minnesota Stewardship Species

Minnesota Stewardship Species present in the Prairie Hardwood Transition Region

Bird conservation plans typically focus on identifying species that are declining and facing significant threats and then delineating conservation actions to halt those declines. Audubon Minnesota’s *Implementation Blueprint for Minnesota Bird Conservation* follows that framework. However, as part of the process for identifying priority species it became clear that there are several species that reach exceptionally high abundance in Minnesota due to the quantity of quality habitat that meets their needs during the breeding season. The Golden-winged Warbler and Sedge Wren are outstanding examples; Minnesota supports 42% and 33% of their global populations respectively. Their future survival may depend on how well Minnesota protects and manages their key habitats. Although no other species reach the level of significance globally that these two species do, there are several that reach very high levels of abundance in the state. For example, although the percentage of their population in Minnesota seems low the Veery, Chestnut-sided Warbler and Nashville Warbler, reach their highest abundance south of Canada in the forests of Minnesota.

A total of 12 species that breed in Minnesota have been designated as Minnesota’s Stewardship Species. These species had to meet two criteria: 1) >5% of their global population occurs in Minnesota; and 2) >5% of their North American breeding range occurs in Minnesota. Because of the number of birds that our state supports we have a unique responsibility to ensure that we maintain suitable habitat to sustain their robust populations. The percent of each Stewardship Species population that occurs in the Prairie Hardwood Transition Region is shown in Table 2.

Table 2. Minnesota Stewardship Species (species highlighted in red are most important in the region)

Stewardship Species	Percent of Global Population in Minnesota's Prairie Hardwood Transition Region*	Percentage of Global Population in Minnesota
Trumpeter Swan	10-15% of global population in MN; % in Prairie Hardwood Transition is unknown	12%
American White Pelican	417 nests at 3 colonies; 0.3% of global population	18%
American Woodcock	1.9%	10%
Black-billed Cuckoo	1.7%	10%
Sedge Wren	7.5%	33%
Veery	0.4%	6%
Golden-winged Warbler	2.2%	42%
Nashville Warbler	0.0%	5%
Chestnut-sided Warbler	0.2%	6%
Bobolink	2.2%	13%
Rose-breasted Grosbeak	2.2%	6%
Baltimore Oriole	2.3%	5%

***Note:** These numbers were derived by summing the percent population in Partners in Flight's (PIF) BCR23 in Minnesota and the percentage of PIF BCR22 in Minnesota that was combined with BCR23 (86%). Percent of each species population that occurs in BCR23 and BCR22 was obtained from http://rmbo.org/pif_db/lape/; http://rmbo.org/pif_db/laped/. Numbers for the American White Pelican come from King and Anderson (2005); numbers for the American Woodcock come from Kelly et al. (2008).

Recommendations regarding Stewardship Species

During the breeding season, the Prairie Hardwood Transition Region does not support any breeding species with an unusually high percentage of its global population in this region, other than the Sedge Wren. A few recommendations, however, are also included for the American White Pelican.

1. Sedge Wren

Recommendation: Annually monitor the population via the federal Breeding Bird Survey.

2. American White Pelican

Background: American White Pelicans have increased their distribution and abundance in Minnesota since the 1970s. As their numbers have increased so have concerns of lakeshore residents and anglers that pelicans are negatively impacting local fish populations. In fact, in 2011, an individual was sentenced for destroying nearly 2,500 pelican eggs and chicks on Minnesota Lake, located in the Prairie Parkland Province. As of 2010, pelicans were breeding in 2 locations in the Prairie Hardwood Transition Region (Table 3).

Table 3. American White Pelican Breeding Colonies in the Prairie Hardwood Transition Region in 2004 and 2010

Site	County	Number of Nests	
		2004	2010
Pigeon Lake	Meeker	357	543
Swartout Lake, Swart Watts Lake	Wright	49	913

Recommendations:

- Work with conservation partners to educate the public regarding the pelican’s ecological role in the lake ecosystem and insure that colony sites are protected and not vandalized.
- Aerial surveys of the two colony locations should be conducted every 3-5 years.

Migrant Species

Importance of the Prairie Hardwood Transition Region for Migrant Species

Perhaps the most notable feature of the Prairie Hardwood Transition Region is the Mississippi River, one of the most remarkable migratory flyways in North America. From its’ small beginnings in Itasca State Park to its’ broad floodplain in the southeastern corner of the state, nearly one quarter of the river’s length resides within our state boundaries and nearly all of that resides within the Prairie Hardwood Transition Region. Portions of two other major rivers, the St. Croix and Minnesota, are also located in the region, as well as several smaller tributaries. Indeed, eleven of the 21 Important Bird Areas that are located entirely or partially within the Prairie Hardwood Transition Region are located along major rivers and the critical habitat they provide to migrants was a major factor in their nominations as IBAs (Table 4).

Table 4. Audubon Minnesota Important Bird Areas along Major Rivers and Tributaries in the Prairie Hardwood Transition Region

Audubon Minnesota Important Bird Areas along Major Rivers and Tributaries in the Prairie Hardwood Transition Region			
Mississippi River	Tributaries to the Mississippi River	St. Croix River	Minnesota River
Upper Mississippi River National Wildlife Refuge	Whitewater Valleys	St. Croix – Wild River State Park	Lower Minnesota River Valley
Mississippi River - Twin Cities	Vermillion Bottoms-Lower Cannon River	St. Croix River Bluffs	
North Metro Mississippi River	Blufflands-Root River	St. Croix Lake	
Camp Ripley –Pillsbury-Lake Alexander (<i>located in both the Prairie Hardwood Transition and Boreal Hardwood Transition regions</i>)			

Recommendations for Migrants in the Prairie Hardwood Transition Region:

1. Protect and restore riparian habitats in Important Bird Areas in the Region.
 - Riparian zones along all of the region’s major rivers and streams provide critical habitat for migrating birds during both the spring and fall. Their overall ecological importance to water quality, water storage and water conservation as well as to healthy forests, rivers, streams and wetlands makes riparian areas among the most important habitats statewide. At a minimum, Audubon Minnesota should insure that the forest management guidelines for Riparian Areas established by the Minnesota Forest Resources Council are implemented on each of the region’s Important Bird Areas (*Minnesota Forest Resources Council 2013*).

How are we going to protect these species?

Monitoring

Monitoring species population trends is the key to assessing their long-term status and determining whether conservation actions are having an impact on the species distribution and abundance. Audubon's *Conservation Blueprint* makes the following recommendations for monitoring the highest priority and Target Conservation Species in the Prairie Hardwood Transition Region. Tables 5 and 6 summarize current monitoring that occurs for these species and assesses additional needs.

Recommendations for Species Monitoring

1. Marsh Birds: Investigate the establishment of a statewide marsh bird monitoring program
 - Assess whether the newly developed Marsh Bird Monitoring Program initiated by the USFWS and promoted by the Midwest Avian Partnership has applicability in Minnesota.
 - Ensure that the program is designed to provide significant information on hard-to-detect marsh birds, such as Yellow Rails, Virginia Rails and Least Bitterns.
 - Investigate opportunities to collaborate with the Minnesota Department of Natural Resources' new statewide, statistically designed, wetland monitoring program as an alternative approach to the USFWS's Marsh Bird Monitoring Program.
 - Investigate opportunities to collaborate with the newly proposed Sentinel Wetlands Program that will be administered by the MNDNR.
2. Forster's Tern and Black-crowned Night-Heron: Knowledge of the distribution and abundance of both of these species may be improved with the initiation of a Marsh Bird Monitoring Program. Regardless, the known, larger colonies in the state should be monitored every 3-5 years and the species status assessed on priority IBAs where appropriate.
3. Red-headed Woodpecker: Partner with the Red-headed Recovery Effort to report sightings on IBAs in the region; further details are provided in the Red-headed Woodpecker Conservation Plan.
4. Loggerhead Shrike: Annually monitor known locations and likely habitat within Dakota County.

Although Loggerhead Shrikes continue to be sited at several locations throughout the prairie region of Minnesota as well as in the Prairie Hardwood Transition, their occurrence appears sporadic in the past 10-20 years everywhere except in Dakota County. This county now appears to be the species only remaining stronghold in the state.

5. Cerulean Warbler, Prothonotary Warbler, and Louisiana Waterthrush: Consider undertaking a new statewide assessment for all three species and the design of a long-term monitoring program; assess status of all three species on priority IBAs.

The Cerulean Warbler, Prothonotary Warbler and Louisiana Waterthrush are not detected by the roadside Breeding Bird Survey; as priority species a new method for monitoring their status needs to be established. Priority IBAs for monitoring Cerulean Warblers are identified in the warbler's Conservation Plan.

Special Note: Franklin's Gull

The Franklin's Gull is a Target Conservation Species in the Tallgrass Aspen Parklands Province. Although the vast majority of Minnesota's population occurs in the aspen parklands region, there has been a record of nesting on Lake Osakis in Todd and Douglas County, which is located in the Prairie Hardwood Transition Region. This site, which is also an Important Bird Area, should be regularly monitored not only for Franklin's Gulls but also for the other important waterbirds that nest there.

Table 5. Status of Current Monitoring Efforts and Assessment of Additional Needs for Waterbirds in the Prairie Hardwood Transition Region

Prairie Hardwood Transition Region	Habitat	Status of Current Monitoring Efforts in the Prairie Hardwood Transition Region				New Monitoring Efforts Needed	
Highest Priority Species and Target Conservation Species (Bold Red)		USGS Breeding Bird Survey				Warrants individual site monitoring	New statewide monitoring effort needed
		Moderate	Deficient	Important Deficiency	No Data		
		Regional Credibility	Precision of Data				
Waterbirds							
Pied-billed Grebe	Wetland/Shallow Lake		MN BBS Data has a deficiency		Assess status on priority IBAs ²	Yes	
American Bittern	Wetland		MN BBS Data has a deficiency		Assess status on priority IBAs ²	Yes	
Least Bittern	Wetland		MN BBS Data has an important deficiency		Assess status on priority IBAs ²	Yes	
Black-crowned Night-Heron	Wetland/Shallow Lake		MN BBS Data has a deficiency		Monitor known colonies every 3-5 years; assess status on priority IBAs	Yes	
Forster's Tern	Wetland/Shallow Lake		MN BBS Data has an important deficiency		Monitor known colonies every 3-5 years; assess status on priority IBAs	Yes	

¹ The categories listed depict the credibility of the Breeding Bird Survey data for each species. Precise definitions can be found at: <http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>. Briefly data with moderate precision reflects data with at least 14 samples in the long term, of moderate precision. A Yellow level of credibility means the data have a deficiency because of the species low abundance (<1.0 birds/route), a small sample size (< 14 routes), or the results cannot detect a 3% per year population change over time. Data with an important deficiency means the species has a low abundance (<0.1 birds/route), small sample size (< 5 routes), and/or the results cannot detect a 5% per year change in population.

²Initial focus should be on the region's priority IBAs (see "Where will we work?"); then, if resources are available, identify select IBAs that are most important for the individuals species.

Table 6. Status of Current Monitoring Efforts and Assessment of Additional Needs for Landbirds in the Prairie Hardwood Transition Region

Prairie Hardwood Transition Region	Habitat	Status of Current Monitoring Efforts in the Prairie Hardwood Transition Region				New Monitoring Efforts Needed	
		Moderate	Deficient	Important Deficiency	No Data	Warrants individual site monitoring	New statewide monitoring effort needed
Highest Priority Species and Conservation Target Species (Bold Red)		USGS Breeding Bird Survey (BBS)					
		Regional Credibility	Precision of Data				
Landbirds							
Eastern Whip-poor-will	Mature Upland Aspen-Oak Forest			MN BBS Data has an important deficiency	Identify and then assess status on priority IBAs ²		
Red-headed Woodpecker	Open Woodland			MN BBS Data of moderate precision	See Species Conservation Plan		
Loggerhead Shrike	Open Woodland			MN BBS Data has an important deficiency	Known Dakota County Sites should be monitored annually		
Marsh Wren	Wetland			MN BBS Data of moderate precision	Continue to monitor via the BBS	Would benefit	
Veery	Damp, deciduous forests			MN BBS Data of moderate precision	Continue to monitor via the BBS		
Wood Thrush	Mature mesic hardwood forests			MN BBS Data has a deficiency	Continue to monitor via the BBS		
Brown Thrasher	Shrub/Scrub			MN BBS Data of moderate precision	Continue to monitor via the BBS		
Golden-winged Warbler	Lowland Shrub/Young Aspen			MN BBS Data of moderate precision	Continue to monitor via the BBS		
Cerulean Warbler	Mature mesic hardwood forest			Not detected by BBS	See Species Conservation Plan		
Prothonotary Warbler	River: Very Large			Not detected by BBS	Assess status on priority IBAs ² ; consider new statewide assessment		
Louisiana Waterthrush	River: Headwaters to Large			Not detected by BBS	Assess status on priority IBAs ² ; consider new statewide assessment		
Henslow's Sparrow	Grassland			MN BBS Data has an important deficiency	Identify and then assess status on priority IBAs ²		
Bobolink	Grassland			MN BBS Data of moderate precision	Continue to monitor via the BBS		
Eastern Meadowlark	Grassland			MN BBS Data has a deficiency	See Species Conservation Plan		
Western Meadowlark	Grassland			MN BBS Data of moderate precision	Continue to monitor via the BBS		
Yellow-headed Blackbird	Wetland			MN BBS Data of moderate precision	See Species Conservation Plan	Would benefit	

¹ The categories listed depict the credibility of the Breeding Bird Survey data for each species. Precise definitions can be found at: <http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>. Briefly data with moderate precision reflects data with at least 14 samples in the long term, of moderate precision. A Yellow level of credibility means the data have a deficiency because of the species low abundance (<1.0 birds/route), a small sample size (< 14 routes), or the results cannot detect a 3% per year population change over time. Data with an important deficiency means the species has a low abundance (<0.1 birds/route), small sample size (< 5 routes), and/or the results cannot detect a 5% per year change in population.

²Initial focus should be on the region's priority IBAs (see "Where will we work?"); then, if resources are available, identify select IBAs that are most important for the individuals species.

Habitat Protection, Restoration and Management

The key to focused habitat protection is identifying which habitats are most critical to those species in need of conservation attention. Audubon’s *Conservation Blueprint* relies on the analysis conducted by *Tomorrow’s Habitat for the Wild and Rare: Minnesota’s Comprehensive Conservation Strategy (Minnesota Department of Natural Resources 2006)*. Table 7 lists all habitats present in the Prairie Hardwood Transition Region. Habitats shaded in **RED** are identified as key habitats (see footnotes below) for Species in Greatest Conservation Need in a particular ecological subsection. Target Conservation Species for the region were selected to represent eight of the key habitats: River: Headwaters to Large; River: Very Large; Non-forested Wetland; Shallow Lake; Oak Savanna (including Shrub/Woodland/Brush Prairie); Forest Upland: Hardwood; Forest Upland:Aspen-Oak; and Grasslands (including Prairie) (see Appendix 2). Table 8 lists the habitat associations for each of the region’s highest priority and Target Conservation species.

Table 7. Key Habitats in the Prairie Hardwood Transition Region

Prairie Hardwood Transition Region	Landscapes	Habitats ¹	Key Habitats in each Ecological Subsection within the Prairie Hardwood Transition Region (Percent of habitat present in the subsection in the 1990s; habitats shaded in red are identified as Key Habitats in the Subsection) ²							Total # Subsections where Habitat is “Key”
			Anoka Sandplain	Big Woods	Blufflands	Hardwood Hills	Oak Savanna	Rochester Plateau	St. Paul Baldwin Plains and Moraines	
Forest		Forest Lowland Deciduous	2.4	1.0	4.9	0.4	0.4	1.2	1.4	0
		Forest Lowland Coniferous	6.2	0.4	0.8	3.1	0.6	0.3	0.7	0
		Forest Upland Coniferous	1.6	0.2	0.8	0.2	0.0	0.1	2.0	0
		Forest Upland Deciduous Aspen-Oak	2.1	0.1	0.0	4.0	0.0	0.0	0.3	3
		Forest Upland Deciduous Hardwood	11.0	2.8	28.3	10.0	1.3	4.6	6.3	3
Open		Shoreline-Dunes-Cliff/Talus	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2
		Shrub Lowland	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
		Oak Savanna	0.7	3.3	1.1		0.2		2.8	5
		Shrub/Woodland-Upland (Oak Savanna/Brush Prairie)				2.0		0.1		2
		Prairie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6
		Grassland	17.6	13.6	22.9	20.9	9.9	20.9	13.4	6
		Cropland	36.4	61.1	34.0	44.1	83.6	69.8	30.3	0
		Developed	12.4	8.0	2.4	0.4	2.6	2.7	31.3	0
		Wetland Nonforested	4.5	3.9	1.1	5.8	Wet Prairie 0.6	0.2	3.5	7
	Aquatic		Lake Deep	2.3	2.0	2.3	6.9	0.2	0.1	6.3
		Lake Shallow	2.8	3.7	1.4	2.2	0.6	0.0	1.7	4
		River Headwater to Large	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7
		River Very Large	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3

¹Background on Habitat Classification:

- Many different classifications have been used in Minnesota to classify bird habitats. These classifications range from a simple classification of cover types to more complex classifications that incorporate age and structural features of the habitats. One of the principal challenges is that classifications that focus on the plant community rarely incorporate the stand and landscape level features that are important to birds when they select a site(s) for nesting. In addition, the habitats birds use may vary throughout the breeding season, from courtship to nesting to brood rearing.
- For the sake of simplicity, we have used the habitat classification that was developed for Minnesota’s Comprehensive Wildlife Conservation Strategy (CWCS): “Tomorrow’s Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife” (Minnesota Department of Natural Resources 2006). The advantages are that the CWCS is widely available, the habitat classification was developed in consultation with Minnesota County Biological Survey plant community ecologists, it has been cross-walked with Minnesota’s Native Plant Community Types, and it incorporates seral stages of plant community succession (e.g. the Shrub Upland Habitat includes plant communities that are successional stages of upland forest communities).

²Background on Key Habitat Analysis:

- Key habitats were identified by the Minnesota Comprehensive Wildlife Conservation Strategy. Five different analyses were developed to identify key habitats in each ecological subsection. A prime factor in all five analyses was the use of the habitat by the plan’s designated Species in Greatest Conservation Need (SGCN), many of which are also priority species in this plan. Data shown above only includes those key habitats that supported SGCN birds.

Table 8. Habitat Associations of Highest Priority and Conservation Target Species in the Prairie Hardwood Transition Region

Prairie Hardwood Transition Region Species (Species highlighted in Red are Target Conservation Species)	Habitats																	
	Forests					Open Landscapes										Aquatic		
	Lowland Deciduous	Lowland Coniferous	Upland Coniferous	Upland Deciduous Aspen-Oak	Upland Deciduous Hardwood	Shoreline/Dunes	Shrub Lowland	Oak Savanna	Shrub Upland	Prairie	Grassland	Cropland	Developed	Wetland Non-forested	Lake Deep	Lake Shallow	River: Headwaters to Large	River: Very Large
Highest Priority																		
Pied-billed Grebe																		
American Bittern																		
Least Bittern																		
Red-headed Woodpecker																		
Loggerhead Shrike																		
Marsh Wren																		
Veery																		
Brown Thrasher																		
Golden-winged Warbler																		
Cerulean Warbler																		
Henslow's Sparrow																		
Bobolink																		
Eastern Meadowlark																		
Western Meadowlark																		
Yellow-headed Blackbird																		
Additional Focal Species																		
Forster's Tern																		
Wood Thrush																		
Louisiana Waterthrush																		
Prothonotary Warbler																		

Recommendations for Habitat Protection, Restoration and Management for Breeding Species in the Prairie Hardwood Transition Region

- Significant habitat protection, restoration and management efforts currently underway
Numerous habitat protection initiatives are underway in the Prairie Hardwood Transition Region. Because the province encompasses the prairie-forest border, grassland and wetland protection remains a priority. As is the case further west in the state, long-standing habitat acquisition efforts by the U.S. Fish and Wildlife Service and Minnesota Department of Natural Resources, as well as other smaller programs (The Nature Conservancy, Scientific and Natural Areas, Native Prairie Bank, etc.) have resulted in a patchwork of protected wetlands and grasslands. Active efforts to protect lake shorelines, acquire and protect streams and their riparian areas, and to restore the natural channels of rivers and streams have received increased emphasis in the past decade in this region. Programs to protect open spaces as regional parks and trails by the Metropolitan Council have protected significant acreages as have formerly active programs such as Metro Greenways. Equally important have been an array of programs focused on protecting and enhancing the Mississippi River floodplain, backwaters and tributaries.
- Recommendations for Habitat Protection
 1. Focus habitat protection work on Rivers (both Headwaters to Large and Very Large), Shallow Lakes, Non-forested Wetlands, Oak Savanna/Brush Prairie, Forest Upland: Hardwood, Forest Upland: Aspen-Oak, and Prairie/Grassland.

Background:

- These habitats were identified as Key Habitats in three or more Ecological Subsections within the Prairie Hardwood Transition Region.
 - Perhaps the most distinguishing feature of the region's landscape is its heterogeneity, from the confluence of three major rivers (Minnesota, Mississippi and St. Croix) to the bluffs in the extreme southeast, from the densely urbanized landscape around the Twin Cities to the agricultural fields in the south and the mixed upland-coniferous forests in the north.
 - Among the prime concerns in managing Minnesota's Prairie Hardwood Transition is retaining and restoring native prairies, oak savannas and wetlands and sustainably managing large contiguous blocks of hardwood forests.
2. Support the habitat protection goals established by the Upper Mississippi Valley/Great Lakes (UMVGL) Joint Venture for key habitats in the Region (Table 9).

Background: The UMVGL Joint Venture habitat targets were derived by selecting focal species for each major habitat and modeling the habitat needed to achieve established population goals. The data is for that portion of BCR23 that occurs in Minnesota as well as that portion of BCR22 that occurs in the SE corner of the state. The latter number was computed using a dot grid to assess what portion of BCR22 in Minnesota occurs only in the SE (6/7) as opposed to that portion that occurs only in the SW (1/7); then the number in the UMVGL JV plans for BCR22 was apportioned respectively. The Upper Mississippi Valley/Great Lakes Joint Venture plans used a different habitat classification than that used in Minnesota's *Conservation Blueprint*, which is modeled after *Tomorrow's Habitat for the Wild and Rare* (Minnesota Department of Natural Resources 2006). The JV habitats were translated to fit the classification used by Minnesota's Conservation Blueprint.

3. Insure that the habitat protection efforts meet the Minnesota Conservation Goals and Objectives for the Target Conservation Species in the Prairie Hardwood Transition Region.

4. Habitat protection efforts should also meet the minimum habitat size requirements for the region's highest priority species and Target Conservation Species (Table 11).

Table 9. Habitat Protection Goals for the Prairie Hardwood Transition Region

Habitat	Bird Groups				Total Acreage
	Waterfowl	Waterbirds	Shorebirds	Landbirds	
Non-forested Wetlands	182,683 ha	2,041 ha	3,936 ha	-	188,660 ha
Dry Mudflats (agricultural)			1,518 ha		1,518 ha
Upland Deciduous and Mixed Deciduous/Coniferous				421 ha	421 ha
Upland Coniferous				150 ha	150 ha
Lowland Deciduous				-	-
Shrub Lowland				2,198 ha	2,198 ha
Grasslands (Native Prairie and Surrogate Grasslands)				442 ha	442 ha
Oak Savanna (Mixed wooded openland)				3,312 ha	3,312 ha
Total Acreage	182,683 ha	2,041 ha	5,454 ha	6,523 ha	196,701 ha

- **Recommendations for Habitat Restoration in the Prairie Hardwood Transition Region**

1. Support the habitat restoration goals established by the Upper Mississippi Valley/Great Lakes Joint Venture for BCR 22 and 23 in Minnesota as a guide for bird conservation in the region (Table 10).

Background: Data for Table 10 was compiled from the respective bird conservation plans for the Upper Mississippi Valley/Great Lakes Joint Venture in the same manner as the habitat protection goals detailed in Table 9.

2. Insure that the habitat restoration goals meet the Minnesota Conservation Goals and Objectives for the Target Conservation Species in the region.

Table 10. Habitat Restoration Goals for the Prairie Hardwood Transition Region

Habitat	Bird Groups				Total Acreage
	Waterfowl	Waterbirds	Shorebirds	Landbirds	
Non-forested Wetlands	36,511 ha	1,396 ha	1,776 ha	-	39,683 ha
Dry Mudflats (agricultural)			5,659 ha		5,659 ha
Upland Deciduous and Mixed Deciduous/Coniferous				215 ha	215 ha
Upland Coniferous				7 ha	7 ha
Lowland Deciduous				-	
Shrub Lowland				570 ha	570 ha
Grasslands (Native Prairie and Surrogate Grasslands)				442 ha	442 ha
Oak Savanna (Mixed wooded openland)				3,312 ha	3,312 ha
Total Acreage	36,511 ha	1,396 ha	7,435 ha	4,546 ha	49,888 ha

Table 11. Minimum Habitat Requirements to consider in Habitat Protection and Habitat Restoration Efforts for the Highest Priority Species and Conservation Target Species

Minimum Habitat Area Required	Grasslands	Wetlands	Shrublands	Open Woodlands	Mesic Upland and Lowland Forest
> 0.2 ha		Pied-billed Grebe			
> 0.9 ha				Red-headed Woodpecker (prefers >1.5 ha)	
> 5 ha			Brown Thrasher: (an edge species, more likely to occur along fields > 6 ha; isolated shelterbelts and shrubs are best)	Loggerhead Shrike (territories average 6-9 ha)	
> 10 ha	Bobolink	American Bittern Least Bittern Marsh Wren (will use smaller wetlands but large, diverse ones are recommended) Golden-winged Warbler	Golden-winged Warbler		
> 20 ha	Eastern Meadowlark (may use smaller areas but larger ones needed to sustain population)	Yellow-headed Blackbird Black-crowned Night-Heron (may require >200 ha for foraging and nesting) Forster's Tern			Wood Thrush (the species is considered area sensitive and in the Midwest sites that are most suitable are at least 80 ha in size; though the thrush may be found in woods as small as 1 ha; likely less successful in smaller forest tracts)
> 100 ha	Henslow's Sparrow (grasslands > 100 ha preferred, but smaller areas of suitable habitat (30 ha) are also used)				Veery (the species is less area sensitive in the northern region than further south with virtually any size forest patch providing suitable habitat in landscapes that are at least 50% forested) Louisiana Waterthrush Prothonotary Warbler (avoids waterways with wooded borders <30 m wide)
> 400 ha					Cerulean Warbler (Conservation Area includes core block >700 ha located within a 4,000 ha matrix that should be >50% forested and >25% mature forest; see species account)

Note: The literature does not provide minimum habitat area requirements for the Western Meadowlark. However, Western Meadowlarks often depend on the presence of other critical factors that are summarized in the habitat management requirements for grasslands in Table 13.

- Recommendations for Habitat Management

Table 12. Management Recommendations for Wetland Species

Note: Data for many species taken from individual species accounts in the series, *Effects of Management Practices on Wetland Birds*, compiled by Doug Johnson, USGS (*Johnson et al. 2002*); other data gathered from a series of publications listed in each individual species account compiled for the Minnesota Bird Conservation Plan.

Wetland Species								
Species	Minimum Area	Water Depth	Vegetation height (cm)	Visual obstruction (Robel pole)	Emergent Cover (%)	Wetland Drawdowns	Disturbance (burning, mowing, grazing)	Other Important Features
							Note: all disturbances need to leave some areas of the tract untreated	
Pied-billed Grebe	>0.2 ha	> 25 cm	-	-	Dense stands (>10cm ² stem basal area/m ²)	Avoid complete drying to prevent die-offs of dragonflies and fish	-	-
American Bittern	> 10 ha	< 61 cm	30-203 cm	44-49 cm	-	-	Not more often than 2-5yr	-
Least Bittern	> 10 ha	> 30 cm	-	-	-	-	-	-
Black-crowned Night-Heron	> 20 ha; may require >200 ha for foraging	Use of wetlands strongly depends on water levels	Variable; may nest in trees, shrubs or on ground	-	-	-	-	Flies up to 24 km from colony to forage in shallow ponds, creeks, marshes, etc.
Forster's Tern	> 20 ha	< 1m for foraging	-	-	-	Periodic drawdowns can be beneficial	-	Builds nests on muskrat lodges or mats of floating vegetation, such as cattail mats
Marsh Wren	> 10 ha	0-132 cm	-	-	-	-	-	Dense stands of emergent vegetation
Yellow-headed Blackbird	> 20 ha	≥ 30 cm considered best	-	-	50%	-	-	Hemi-marsh (50:50 ratio of open water to emergent vegetation is preferred)

Table 13. Management Recommendations for Grassland Species

Note: Data available for some species from individual species accounts in the series, Effects of Management Practices on Grassland Birds, compiled by Doug Johnson USGS (*Johnson et al. 2004*); other data gathered from a series of publications listed in each individual species account compiled for the Minnesota Bird Conservation Plan.

Grassland Species											
Species	Minimum Area	Vegetation Height (cm)	Visual obstruction (Robel pole)	Grass Cover (%)	Forb Cover (%)	Shrub Cover (%)	Bare Ground Cover (%)	Litter Cover (%)	Litter Depth (cm)	Disturbance (burning, mowing, grazing)	Other Important Features
										Note: all disturbances need to leave some areas of the tract untreated	
Loggerhead Shrike	> 5 ha	30-121 cm	-	13-45%	9%	6-18%	28-40%	-	-	Grassland management should leave a few scattered shrubs or trees for nesting; these should be protected from grazing and rubbing by cattle	Leave fences standing for perching and impaling prey
Henslow's Sparrow	> 100 ha	20-122 cm	25-40	10-51%	10-55%	≤2%	≤5%	15-30%	≤7cm	Mowing compatible if vegetation is allowed to grow to an acceptable height and density by next breeding season; fire may be necessary but site will not be used for 1-2 years; management should be before April 15 or after September 15	Require dense litter and significant residual vegetation
Bobolink	> 10 ha	10-134 cm	6-26	17-65%	15-33%	≤22%	≤35%;	5-39%	≤9 cm	Responds positively to disturbance in early spring or fall; do not graze to a height less than 25 cm; disturbance on a 3-6 year rotation; delay mowing till after July 15	Prefers fields with a mixture of grasses and forbs; hayfields should be more than 8 years old
Eastern Meadowlark	> 20 ha	10-156 cm	6-88	53-86%	4-61%	≤4%	<35%	6-23%	1-10 cm	Burn every 3-5 years; mow only at intervals of ≥3 years but delay until August	
Western Meadowlark	Not known	12-64 cm	2-31	13-70%	3-39%	≤53%	1-57%	11-36%	<18 cm	Burn every 3-5 years; mow after July 15 on a 3-5 year rotation	

Table 14. Management Recommendations for Forest/Woodland Species

Note: Data gathered from a series of publications listed in each individual species account compiled for the Minnesota Bird Conservation Plan

Forest Species						
Species	Minimum Area	Forest Type	Forest Age	Forest Structure	Cavity Trees	Special Features
Eastern Whip-poor-will	Minimum area not known but generally does not use small, isolated woodlots	Dry deciduous or mixed forest	Regeneration to pole-stage forest stands; favors even-aged, early successional forests	Forests usually adjacent to forest openings that are used for foraging		Proximity to open areas for foraging & fairly sparse ground cover are key elements of habitat chosen
Red-headed Woodpecker	> 0.2 ha; prefers >1.5 ha	Oak Savanna; Open oak woodland ; Bottomland hardwoods	Mature; Overall stand decadence important	Open understory; can be created by prescribed burning and understory thinning	Yes; snags should be 30-90 cm dbh; snags should be maintained in groups rather than widely dispersed	Presence of mast trees (i.e. oaks, hickory or beech) is important
Veery	> 100 ha	Deciduous Forest Upland Mixed Forest Riparian Forest	Variety of successional stages as long as there is thick, deciduous undergrowth	Dense understory is important	-	-
Wood Thrush	> 20 ha	Upland Deciduous Forest Upland Mixed Forest	Moderately aged (15-40 year old) deciduous forests are preferred but also found in mixed habitats such as fir-spruce-birch forest type. Classified as a hardwood and mature forest dependent species.	Well-developed and diverse tree canopy (trees greater than 16 m in height), dense shrub or sapling layers, shade, a fairly open forest floor and a well-developed layer of leaf litter.	-	In areas of sympatry with the Veery, the Wood Thrush prefers more mature forests with more canopy cover, fewer shrubs, and more leaf litter. The Wood Thrush Forages in leaf litter or on semi-bare ground where herbaceous cover is open; considered Area Sensitive
Brown Thrasher	> 5 ha	Oak Savanna; Semi-Open Deciduous; Shelterbelts Shrubby woodland growth in agricultural areas	Shrub or mid-successional stage of forest	Dense shrubs; open canopy	-	Presence of fruit bearing trees Thorny shrubs for nesting
<i>Continued on next page</i>						

Table 13. continued

Forest Species						
Species	Minimum Area	Forest Type	Forest Age	Forest Structure	Cavity Trees	Special Features
Cerulean Warbler	> 400 ha	Mature deciduous fests, both upland and lowland	Mature; trees should be >20 m in height and 25-55 cm dbh	Multi-layered canopy with small canopy gaps	-	Area sensitive species; refer to the Cerulean Warbler Conservation Area Model (see page 34 of the PIF Physiographic Region 16 Plan: http://www.partnersinflight.org/bcps/plan/pl_16_10.pdf)
Prothonotary Warbler	> 100 ha	Floodplain Forest; Lowland Deciduous Forest; moist bottomland forests that are seasonally flooded or permanent wetlands	Mature forests	Sparse understory and ground cover; 50-75% canopy cover with a height of 12-40 m.	Uses natural or woodpecker excavated cavities in dead snags or limbs of live trees, as well as nest boxes; trees with nest cavities average 15 to 20 cm dbh	Flat terrain, shaded forest habitats w/sparse understory
Louisiana Waterthrush	> 100 ha	Lowland Deciduous; Mesic deciduous upland	Mature forests	Mature forest with downed logs and/or bank cavities used for nesting	-	Streams in steep-sided valleys; exposed, emergent rocks at the edge of water or within a stream; submerged leaf litter; and areas of water less than 3-5 cm deep

Where are we going to work?

Breeding Grounds

Important Bird Areas to Focus on in Minnesota's Prairie Hardwood Transition Region

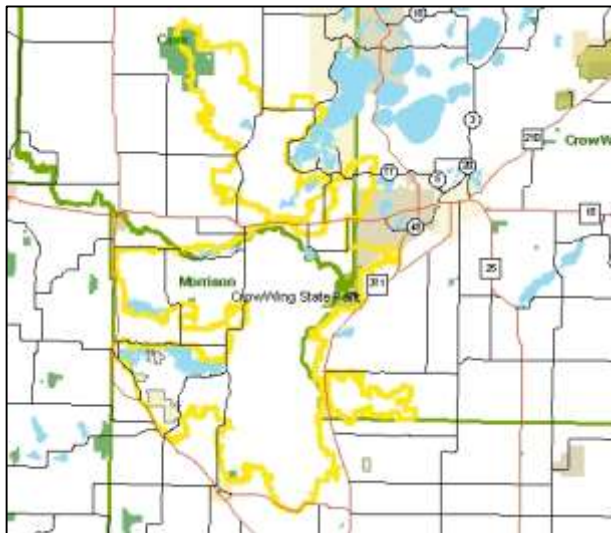
- Significant IBAs to focus efforts on for Priority Species

A broad analysis of the IBAs in Minnesota's Prairie Hardwood Transition Region was conducted to assess their relative importance using the following criteria:

1. Presence of priority species
2. Threats to the site
3. Need to act
4. Ability to acquire funding
5. IBA aligns with partner priorities
6. Bird Life ranking
7. Audubon Minnesota capabilities/capacity

Following this analysis, a more detailed analysis of the sites importance to the priority species was conducted. The result was the identification of four sites where more focused work on breeding birds is warranted at this time:

Camp Ripley-Pillsbury-Lake Alexander Important Bird Area



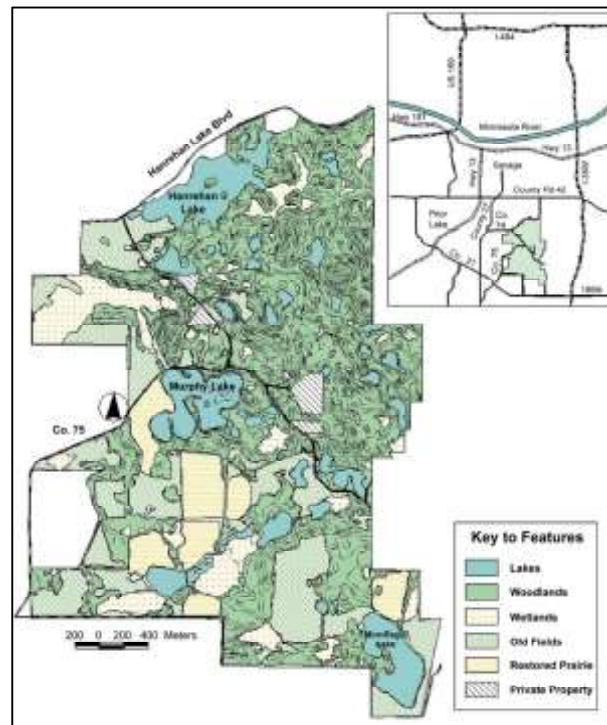
Camp Ripley-Pillsbury-Lake Alexander Recommendations:

1. Conduct an updated assessment of the priority bird species present on the IBA.
2. Assess whether additional monitoring work is warranted for the priority breeding species
3. Share Audubon Minnesota's Implementation Blueprint for Bird Conservation with Camp Ripley biological staff.
4. Engage with the Forest Resources Council, MNDNR, BWSR and other partners who are protecting a buffer around Camp Ripley through conservation easements and the preparation of Forest Stewardship Plans.
5. Review current management plans for the public lands and work to incorporate habitat needs of priority species.
6. Explore funding opportunities with the Upper Mississippi Valley/Great Lakes Joint Venture for monitoring and research on the IBA.

Vermillion Bottoms-Lower Cannon River IBA Recommendations:

1. Review the baseline assessment of breeding birds conducted by Eileen Kirsch in 2009; http://files.dnr.state.mn.us/eco/nongame/projects/consgrant_reports/2009/swg_2009_kirsch.pdf
2. Assess whether additional monitoring work is warranted for the highest priority and conservation target bird species.
3. Conservation partners should prepare a management plan that focuses on bird conservation and integrates the management recommendations of the MNDNR field study conducted in 2008-2009.
4. Assess how this IBA integrates and supports National Audubon's focus on the Mississippi River.
5. Explore funding opportunities to continue landowner stewardship planning efforts begun with the National Fish and Wildlife Foundation (2011-2012) and focused on priority breeding bird species and conservation target species.

Murphy Hanrehan Important Bird Area



Murphy Hanrehan Recommendations:

1. Determine whether volunteer monitoring of priority and conservation target forest species is occurring and, if so, if it will continue.
2. Assess whether additional monitoring work is warranted.
3. Review Three River's Park District Management Plan and explore partnership opportunities.

Migration Stopovers

Important Migration Stopovers and Wintering Grounds

In addition to providing habitat protection and restoration habitat goals for all breeding birds in the Upper Mississippi Valley/Great Lakes Joint Venture, the Joint Venture also provided habitat protection and restoration goals for migrating and wintering waterfowl and migrating shorebirds, which often utilize different habitats during these seasons. Once again, the habitat targets were derived by selecting focal species for each major habitat and modeling the habitat needed to achieve established population goals. The data is for that portion of BCR23 that occurs in Minnesota as well as that portion of BCR22 that occurs in the SE corner of the state. The latter number was computed using a dot grid to assess what portion of BCR22 in Minnesota occurs only in the SE (6/7) as opposed to that portion that occurs only in the SW (1/7); then the number in the UMVGL JV plans for BCR22 was apportioned respectively. The Upper Mississippi Valley/Great Lakes Joint Venture plans used a different habitat classification than that used in Minnesota's Conservation Blueprint, which is modeled after *Tomorrow's Habitat for the Wild and Rare* (Minnesota Department of Natural Resources 2006). The JV habitats were translated to fit the classification used by Minnesota's Conservation Blueprint.

Recommendations for Habitat Protection and Restoration for Migrating and Wintering Waterfowl and Migrating Shorebirds in the Eastern Broadleaf Forest Province:

- Support the habitat protection and restoration goals established by the Upper Mississippi Valley/Great Lakes Joint Venture for BCR 22 and 23 in Minnesota as a broad guide for migrant and winter bird conservation in the Prairie Hardwood Transition Region (Tables 15 and 16).
- Insure that the above habitat protection and restoration efforts meet the Minnesota Conservation Goals and Objectives for the Conservation Target Species in the region.

Table 15. Habitat Protection Goals for Migrating and Wintering Waterfowl and Shorebirds

Habitat	Bird Groups		Total Acreage
	Waterfowl	Shorebirds	
Non-forested Wetlands	18,892 ha	311 ha	19,203 ha
Lake Shallow (shallow to moderate water levels; ≤20cm)			
Lake Deep (extensive open water; > 20 cm)	5,557 ha	180 ha	5,737 ha
Shoreline		11 ha	11 ha
Dry Mudflats (agricultural)		73 ha	73 ha
Total Acreage	24,449 ha	575 ha	25,024 ha

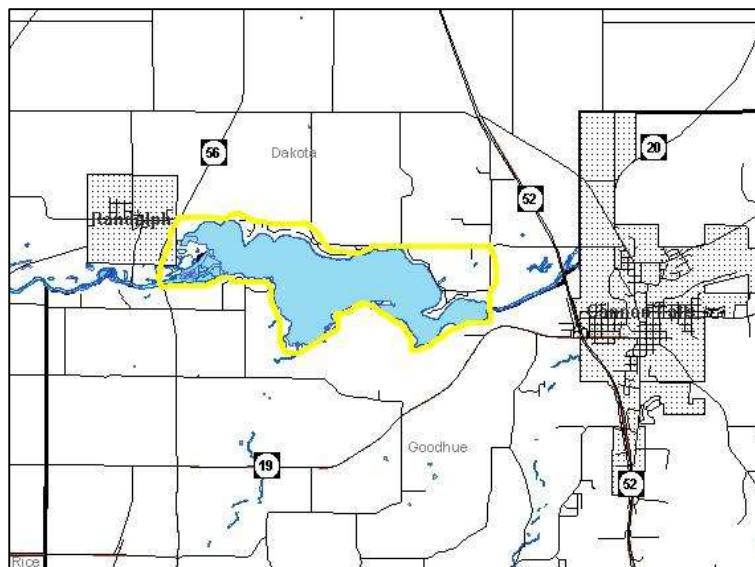
Table 16. Habitat Restoration Goals for Migrating and Wintering Waterfowl and Shorebirds

Habitat	Bird Groups		Total Acreage
	Waterfowl	Shorebirds	
Non-forested Wetlands	501 ha	285 ha	786 ha
Lake Shallow (shallow to moderate water levels; ≤ 20 cm)		78 ha	78 ha
Lake Deep (extensive open water; > 20 cm)	1,189 ha		1,189 ha
Shoreline		31 ha	31 ha
Dry Mudflats (agricultural)		42 ha	42 ha
Total Acreage	1,690 ha	436 ha	2,126 ha

- **Priority Sites for Protecting Migrant Populations**

All four of the Important Bird Areas that are recommended as a focus for Breeding Species also provide important habitat for migrants. This is particularly true for the Lower Minnesota River Valley IBA and the Vermillion River IBA, which provide critical habitat for both migrant and wintering waterfowl. But there is one Important Bird Area in the region that is critically important for migrating shorebirds, Lake Byllesby IBA. In fact, this is the sole reason for the site's nomination. Since there are few sites in the state that are so uniquely important to migrating shorebirds, this site deserves special focus by the IBA program.

Lake Byllesby Important Bird Area



Lake Byllesby recommendations:

1. Assess the status of migrant shorebirds at the site.
2. Assess whether a long-term monitoring program should be established at the site.

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Appendix 1. Process for selection of Priority Breeding Species in the Prairie Hardwood Transition Region

- **Very Rare and Known to be Declining**

All of these species have historically been a component of Minnesota's Prairie Hardwood Transition avifauna but are extremely rare and have experienced documented declines in abundance and/or distribution. These species are considered too rare and/or sporadic in their occurrence to justify focused conservation efforts.

- **Highest Priority Level**

Two approaches were used to identify priority species in each ecological province. The first approach relied heavily on assessments compiled by a team of experts for each Bird Conservation Region delineated by the North American Bird Conservation Initiative; the second approach incorporates more data specific to the species population in Minnesota. The Highest Priority Level was determined as follows:

1. Landbirds

Landbird species that had the highest PIF Regional Combined Assessment Scores ($RCSb \geq 14$ and $Ptr \geq 4$ and $TB \geq 4$; <http://www.rmbo.org/pif/scores/scores.html>) **and** which were declining in the BCR (the Prairie Hardwood Transition) in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the Highest Priority Level species.

2. Waterbirds

Waterbird species that were rated "High Concern" in the Upper Mississippi Valley/Great Lakes Region by the North American Waterbird Conservation Plan (<http://www.pwrc.usgs.gov/nacwcp/pdfs/regional/NPPTText.pdf>) **and** which were declining in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the Highest Priority Level species.

3. Shorebirds

Shorebird species that were rated "Highly Imperiled", "High Concern" or "Moderate Concern" in the Upper Mississippi Valley/Great Lakes Region by the U.S. Shorebird Conservation Plan (<http://www.fws.gov/shorebirdplan/RegionalShorebird/downloads/NORPLPP2.pdf>), the region was rated as very important for either migration or breeding for the species, **and** the species were declining in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the Highest Priority Level species.

4. Waterfowl

Waterfowl species that were rated "Highest" in the North American Waterfowl Management Plan 2004 Implementation Framework in Waterfowl Conservation Region 23 (the Prairie Hardwood Transition Region) (<http://www.fws.gov/birdhabitat/nawmp/files/ImplementationFramework.pdf>) **and** which were declining in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the Highest Priority Level species.

- **High Priority Level**

1. Landbirds

Landbirds that had a high PIF Regional Combined Assessment Score ($RCSb \geq 14$ and $Ptr + TB \geq 7$) **and** which were declining in the BCR (Prairie Hardwood Transition) in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the High Priority Level species. Occasionally a species that met only one of these criteria was added if it was also recognized as a Priority species by other initiatives.

2. Waterbirds

Waterbird species that were rated "Moderate Concern" in the Upper Mississippi Valley/Great Lakes Region by the North American Waterbird Conservation Plan **and** which were declining in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the High Priority Level species. Occasionally a species that met only one of these criteria was added if it was also recognized as a Priority species by other initiatives.

3. Shorebirds
Shorebird species that were rated “High Concern” or “Moderate Concern” in the Upper Mississippi Valley/Great Lakes Region by the U.S. Shorebird Conservation Plan, regardless of whether the region was rated as very important for migration or breeding, **and** the species were declining in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the High Priority Level species. Occasionally a species that met only one of these criteria was added if it was also recognized as a Priority species by other initiatives.
 4. Waterfowl
Waterfowl species that were rated “High” or “Moderately High” in the North American Waterfowl Management Plan 2004 Implementation Framework in Waterfowl Conservation Region 23 (the Prairie Hardwood Transition Region) (<http://www.fws.gov/birdhabitat/nawmp/files/ImplementationFramework.pdf>) **and** which were declining in Minnesota and were dependent on vulnerable habitat in Minnesota were classified as the High Priority Level species. Occasionally a species that met only one of these criteria was added if it was also recognized as a Priority species by other initiatives.
- **Moderate Priority Level**
Species that met the criteria listed above by their respective North American Bird Conservation Plan as High Level Species, which were declining in Minnesota and were dependent on vulnerable habitat in Minnesota, **or** were also recognized by other initiatives as priority species (e.g. Joint Venture Focal Species, state listed species, PIF Continental Concern Species, PIF Stewardship Species) were classified as Moderate Level Priorities.

Appendix 2. Process for Selecting Target Conservation Species in the Prairie Hardwood Transition Region

Target Conservation Species have been defined by various initiatives. In this plan the concept mirrors that of the U.S. Forest Service and the North American Joint Ventures. A target species is essentially a species “whose status and trends are likely to be responsive to changes in ecological conditions, permit inference to the integrity of the overall ecosystem and provide meaningful information regarding the effectiveness of the plan” (*U.S. Forest Service 2012*).

Using this definition, the key habitats present in each Ecological Region, as delineated by *Tomorrow’s Habitat for the Wild and Rare: An Action Plan for Minnesota* (MNDNR 2006), were identified (see Habitat Protection Recommendations). One or more conservation target species was then selected from amongst the pool of priority species shown on page 14, for the most important key habitats in the region.

In Minnesota’s Prairie Hardwood Transition Region the following habitats were identified as “Key Habitats”:

River: Headwaters to Large	Shallow Lake	Forest Upland: Aspen-Oak
River: Very Large	Oak Savanna	Prairie
Non-forested Wetland	Oak Savanna/Brush Prairie	Grasslands
Shoreline-Dunes-Cliff/Talus	Forest Upland: Hardwood	

These eleven key habitats were focused down to the following key components of the Prairie Hardwood Transition Landscape and Target Conservation Species selected for each:

River: Headwaters to Large	Shallow Lake	Forest Upland: Aspen-Oak
River: Very Large	Oak Savanna/Brush Prairie	Prairie/Grasslands
Non-forested Wetland	Forest Upland: Hardwood	

To help guide the decision about which species to select as the Target Conservation Species a prioritization matrix was established that assessed species using the following criteria:

1. Species Level of Priority
2. Species Ecological Significance
3. Species Management Significance
4. Cost Effectiveness and Feasibility of Managing
5. Species Sensitivity to Climate Change
6. Percent of the Species Global Breeding Range that occurs in Minnesota

The priority was to select a target species from the Highest Priority category of species that was ranked high with the above criteria. When that was not feasible, species were selected from other priority categories.