



Credit Jim Williams

Yellow-headed Blackbird Minnesota Conservation Plan

*Audubon Minnesota
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Yellow-headed Blackbird Conservation Blueprint

Xanthocephalus xanthocephalus

Priority for Minnesota's Implementation Blueprint for Bird Conservation

- Prairie Parkland Region (Prairie Parkland Ecological Province): Moderate Level Priority
- Tallgrass Aspen Parklands Region (Tallgrass Aspen Parklands Ecological Province): Moderate Level Priority
- Prairie Hardwood Transition Region (Eastern Broadleaf Forest Ecological Province): Highest Level Priority

Executive Summary

Audubon Minnesota has selected the Yellow-headed Blackbird as one of 26 Target Conservation Species in the state and one of eight species selected to represent Minnesota's Prairie Hardwood Transition Region (also known as the Eastern Broadleaf Forest Province by Minnesota's Ecological Classification System and Bird Conservation Region 23 by Partners in Flight). All eight Target Conservation Species for the region and their level of priority are shown in the table below. Conservation plans were only prepared for the highest priority Target Conservation Species in the region; so plans also have been prepared for the Red-headed Woodpecker, Cerulean Warbler and Eastern Meadowlark.

Highest Level	High Level	Moderate Level
Red-headed Woodpecker	Louisiana Waterthrush	Forster's Tern
Cerulean Warbler		Wood Thrush
Eastern Meadowlark		Prothonotary Warbler
Yellow-headed Blackbird		

Although they have a diverse vocal repertoire, the nasal, raucous call of the male Yellow-headed Blackbird on territory is unmistakable and can be heard even if the bird is not visible. Dependent on shallow, semi-permanent wetlands or deep water marshes, the loss of these habitats in Minnesota is responsible for the species significant population decline.

Minnesota currently supports a population of approximately 300,000 individuals broadly distributed throughout western and central regions of the state. This estimate is derived from data collected by the U.S. Geological Survey's Breeding Bird Survey. Since the survey began in the 1960s, the Yellow-headed Blackbird has declined an average of 3.93% per year in Minnesota, for a cumulative decline of 86%.

This conservation plan is divided into two parts. The first provides background on the Yellow-headed Blackbird, including its status, distribution, habitat requirements and management needs. The second is a detailed conservation plan that outlines specific management recommendations. The highest priorities are targeted at collecting additional information on 14 Audubon Minnesota Important Bird Areas where nesting has been documented and on an additional 17 located in the Prairie Hardwood Transition Region where birds have been observed during the breeding season. Coupled with these inventory priorities, it is important for Audubon to support the Minnesota wetland protection and restoration goals established by the Upper Mississippi River/Great Lakes Joint Venture and the Minnesota Prairie Landscape Conservation Plan.

Introduction

The Yellow-headed Blackbird was selected as a **Target Conservation Species** for Minnesota's *Blueprint for Minnesota Bird Conservation* (<http://mn.audubon.org/>). It is one of eight Target Conservation Species selected for the Prairie Hardwood Transition Region, one of Minnesota's four ecological regions (also known as the Eastern Broadleaf Forest Province by Minnesota's Ecological Classification System and Partners In Flight's Bird Conservation Region 23). The process for selecting target conservation species is described in the *Blueprint's* conservation recommendations for the Prairie Hardwood Transition Region and is available on the Audubon Minnesota website. Briefly, target species are defined as birds '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.' This has been broadly adapted from the U.S. Forest Service's definition of Focal Species in the 2012 revisions to the National Forest System Land and Management Planning Rule (*U.S. Forest Service 2012*).

In the Prairie Hardwood Transition Region target species were selected to represent the following habitats as delineated and described by the Minnesota Department of Natural Resources in *Tomorrow's Habitat for the Wild and Rare* (2006):

1. Shallow Lakes
2. Oak Savanna/Brush Prairie
3. Forest Upland: Aspen-Oak
4. Forest Upland: Hardwood
5. River: Headwater to Large
6. Prairie Grasslands
7. Wetlands: Non-forested

The Yellow-headed Blackbird was selected to represent non-forested wetland habitats. A complete list of the other priority birds and conservation targets in the Prairie Hardwood Transition Region can be found in the *Blueprint*. Because the *Blueprint's* primary emphasis is to focus attention and resources on a small, select number of conservation targets, a comprehensive conservation plan was prepared for only four of the region's eight target conservation species, i.e. those that were designated the Highest Level Priority.

Background

Status

Legal Status: None

Other Status Classifications:

1. National
 - Identified by Partners in Flight as a Stewardship Species. Rich et al. (2004) identified the Southwest Avifaunal Biome of North America (p. 21) as the region with Management Responsibility for the species. This is likely an error as the Yellow-headed Blackbird's center of abundance is in the Prairie Potholes so it should be considered a Stewardship Species for the Prairie Avifaunal Region (map of avifaunal regions shown on p. 15 of Rich et al. 2004). The recommended conservation action is Long-term Planning and Responsibility.
2. Regional
 - Partners in Flight Bird Conservation Region 23 (Prairie Hardwood Transition): Regional Concern Species: Action is Management (Rich et al. 2004).
3. Minnesota

- Minnesota Species in Greatest Conservation Need 2013 (the Yellow-headed Blackbird was not a Species in Greatest Conservation Need in 2006 but has been designated one for the updated State Wildlife Action Plan; the new list is not yet available publicly).

Range

Historical Breeding Range: The Yellow-headed Blackbird is a prairie wetland nesting species whose distribution is centered in the wetlands of the northern Great Plains. It is broadly distributed from central British Columbia east through the Canadian Prairie Provinces and south through Wisconsin, Minnesota, Iowa, northern Illinois and northwestern Indiana and Missouri. To the west it extends through the Great Plain states of Nebraska, western Kansas, northwestern Oklahoma and Texas through Utah, Nevada, and eastern Oregon and Washington. Remnant populations are present in California, Michigan and Ohio (*Twedt and Crawford 1995*).

In Minnesota, T.S. Roberts (1932) described the Yellow-headed Blackbird as a species commonly found throughout the state. Although it is a bird primarily of the open grassland region, it had been found nesting “more or less commonly at Cass Lake, Leech Lake, Mission Lake in Crow Wing County, Lake of the Woods (at the mouth of the Rainy River) and in St. Louis County (vicinity of Duluth and elsewhere).”

Current Breeding Range: Overall the species continues to inhabit its historical breeding range where suitable wetland habitat remains. In portions of the Midwest where there has been major agricultural conversion, (such as Ohio, Illinois and Indiana), the species’ former range is now inhabited only by small remnant populations. Nevertheless, there is some evidence that Yellow-headed Blackbirds may be expanding their range eastward. Breeding populations were not reported in Michigan before 1956 or Ontario before 1961 and it is increasingly common to have reports of the species from the east coast (*Twedt and Crawford 1995*).

In Minnesota the Yellow-headed Blackbird is still found throughout the western and central region of the state but now is rarely found in the northeastern region. It is also absent from much of the southeastern region except along the backwaters of the Mississippi River and near the mouths of some of its tributaries (Figure 1).

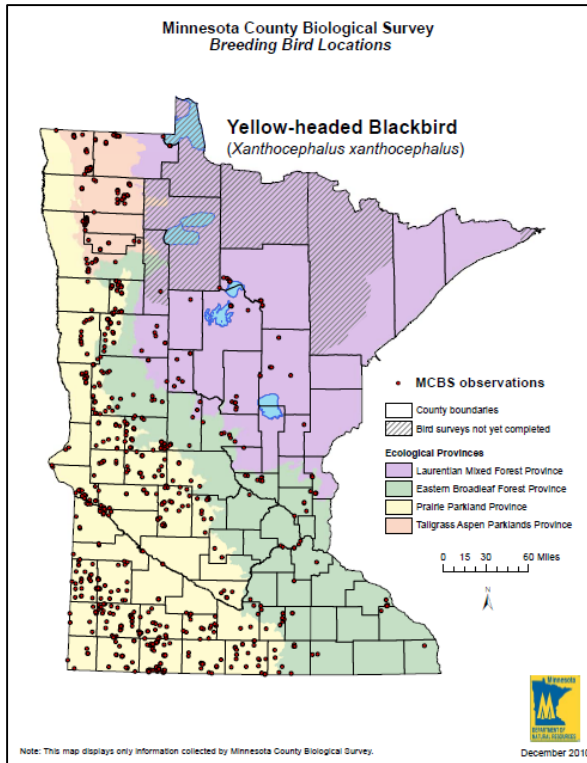
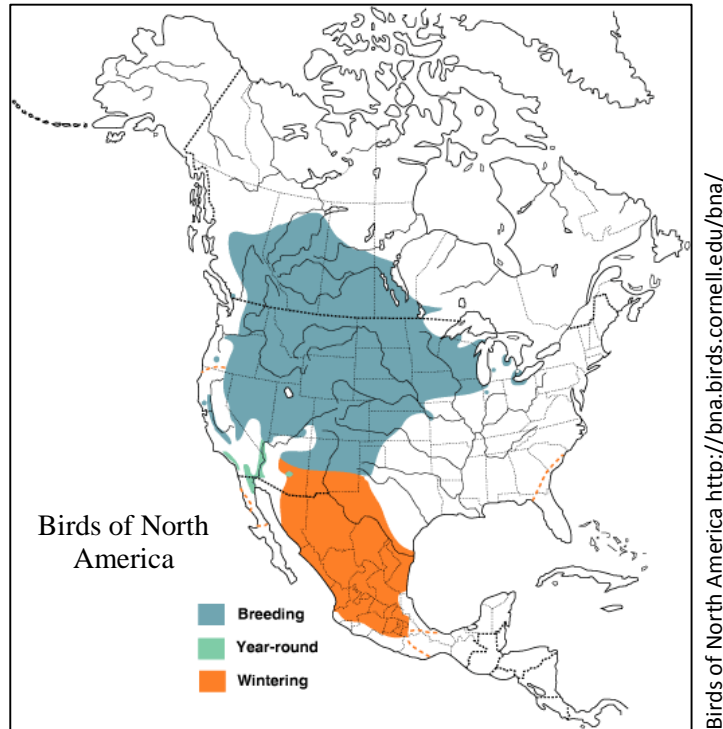
Summary of Presence on Minnesota Important Bird Areas: Yellow-headed Blackbirds have been documented as either a summer resident or migrant on 52 of the 57 Important Bird Areas in Minnesota. Among the 52, they have been confirmed breeding at 14 (Table 1).

Table 1. Minnesota’s Important Bird Areas with Nesting Yellow-headed Blackbirds

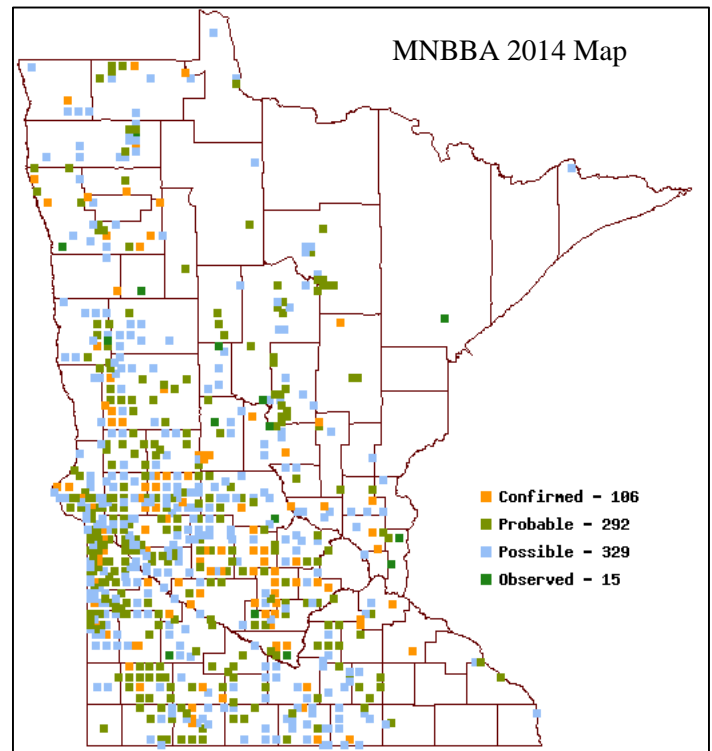
Agassiz National Wildlife Refuge	Kittson-Roseau-Aspen Parklands	Thief Lake
Des Moines River	Lac Qui Parle-Big Stone	Upper Mississippi River National Wildlife Refuge
Goose Lake Swamp	Lake Osakis	Voyageurs-Kabetogama
Hamden Slough National Wildlife Refuge	Sherburne National Wildlife Refuge	Whitewater Valleys
Heron Lake	St. Croix-Greater Wild River	

Given the wide distribution of these fourteen IBAs, it is likely that the birds are breeding at many of the IBAs across Minnesota.

Figure 1. Yellow-headed Blackbird Distribution Maps



MN DNR http://www.dnr.state.mn.us/eco/mcbs/bird_map_list.html



MN Breeding Bird Atlas <http://www.mnbba.org/>

Population Numbers

National

- In 2004, the population estimate for the U.S. and Canada was 23,000,000 (*Rich et al. 2004*). In 2012, the U.S. and Canada population had declined significantly to 11,000,000 (*Partners in Flight Science Committee 2013*).

This is a dramatic decline given that, as noted below under “Population Trends”, the Yellow-headed Blackbird has experienced only a non-significant decline of -0.36% per year since 1966 at the national level. The major factor responsible for the lower population estimate can be attributed to a change in the model used to establish population estimates in 2004 for all landbirds monitored by the Breeding Bird Survey. A description of the original model can be found in Rosenberg and Blancher (2005) and Blancher et al. (2007).

Janet Ruth, a biologist with the U.S. Geological Survey in Fort Collins, is preparing a Status Assessment and Conservation Plan for the Grasshopper Sparrow (*Ruth, in preparation*). In the draft document she provides an excellent summary of the model changes that have been employed to update all landbird population estimates in 2012:

The methodology for these initial PIF (Partners in Flight) landbird population estimates is described in Rosenberg and Blancher (2005). Several evaluations (Thogmartin et al. 2006) and tests of assumptions have been conducted since the initial results were published in Rich et al. (2004). Thogmartin et al. (2006) expressed concerns about the biases related to sampling by BBS, on which most of the population estimates were based, as well as the inadequacy of the adjustment factors (pair, detection, and time-of-day adjustments) and made recommendations regarding how to address these issues and improve the estimates.

A sensitivity analysis of the estimation methods concluded that the most efficient means of improving the estimates would be to address distance detection, time-of-day adjustments, and variability in BBS count data (Thogmartin 2010). Field tests of detection distances have found that detection distances and detection efficiencies assumed by Rosenberg and Blancher (2005) were too high and concluded that the result was substantial underestimates for populations of some groups of landbirds (Confer et al. 2008; Hamel et al. 2009).

In response to reviews and publications, PIF has revised the population estimation methodology; (1) detection distance categories assigned to species have been revised using additional data and more refined distance categories, (2) instead of using a standard pair adjustment of 2X, species are now assigned to one of five different categories between 1.0 and 2.0, and (3) time-of-day adjustments have been revised in response to suggestions in Thogmartin et al. (2006).

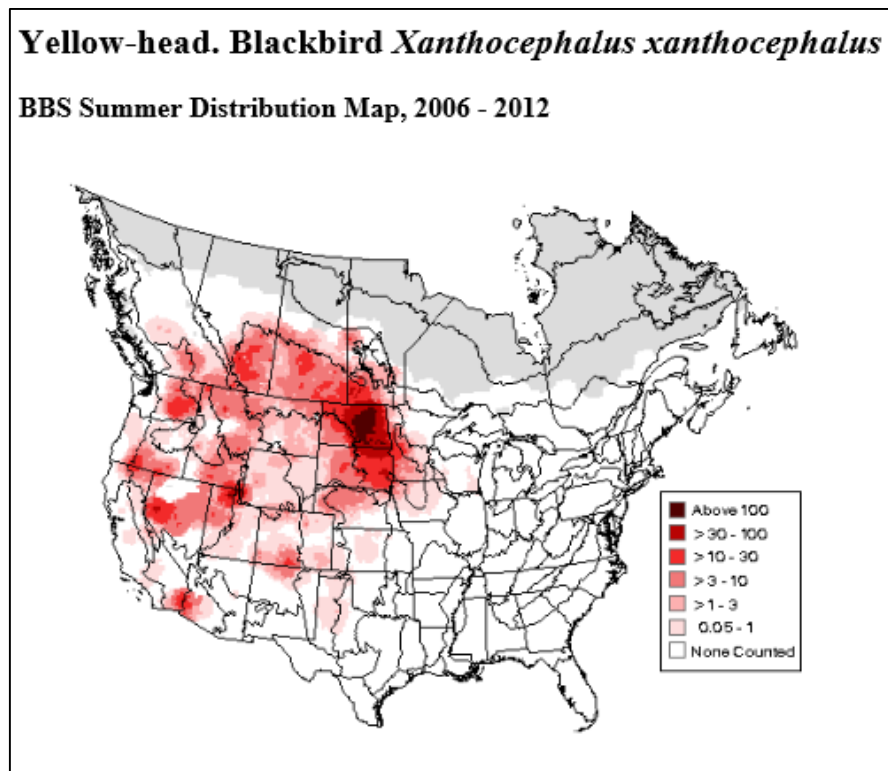
The adjustment factors used in the Yellow-headed Blackbird model are shown in Table 2. The adjustments for detection distance and time of day were not changed; only the pair adjustment was revised significantly, changing from 2.00 to 1.00. The latter adjustment is an effort to account for the Yellow-headed Blackbird’s breeding behavior. Females breed in their first spring after hatch; males, however, usually do not establish territories or breed until their second spring. Even older males may not breed during a given year and become nonbreeding floaters instead. In addition, the Yellow-headed Blackbird is a polygynous species, so one male usually breeds with multiple females (*Twedt and Crawford 1995*). In light of these behaviors, it is unreasonable to assume that each singing male represents one pair (which would be a pair adjustment of 2.00); so, in 2012 the factor was adjusted down to 1.00. This alone would have reduced the population estimate by 50%; the remaining decline can be attributed to the species real-time decline in numbers.

Table 2. Adjustment Factors used for the Yellow-headed Blackbird Population Estimate

Year	Detection Distance	Pair Adjustment	Time of Day Adjustment
2004	200 meters	2.00	1.45
2012	200 meters	1.00	1.45

- Continental Population Objective: Maintain current population levels (*Rich et al. 2004*).
- The relative abundance of breeding birds from 2006-2012 across North America, assessed by the Federal Breeding Bird Survey (*Sauer et al. 2014*), is illustrated below.

Figure 2. Relative Abundance of the Yellow-headed Blackbird in North America (2006-2012).



Regional

- Approximately 58% of the Yellow-headed Blackbird's population occurs in the Prairie Pothole Joint Venture Region (*Niemuth 2005*).

Minnesota

- Minnesota does not include one of the species centers of highest abundance; its' center of abundance occurs in central North Dakota.

- 4.23% of the Yellow-headed Blackbird's North American breeding range occurs in Minnesota; in 2012, 2.7 % of the Yellow-headed Blackbird population occurred in Minnesota (compared with an estimate of 4.4% in 2004).
- Minnesota population estimate in 2004: 980,000
 - ✓ Estimated MN population in BCR11: 540,000
 - ✓ Estimated MN population in BCR12: 41,000
 - ✓ Estimated MN population in BCR22: 5,200
 - ✓ Estimated MN population in BCR23: 390,000
- Minnesota population estimate in 2012: 300,000
 - ✓ Estimated MN population in BCR11: 190,000
 - ✓ Estimated MN population in BCR12: 16,000
 - ✓ Estimated MN population in BCR22: 1,900
 - ✓ Estimated MN population in BCR23: 90,000

Population Trends

National Breeding Bird Survey (BBS) Data (U.S. and Canada, Sauer et al. 2014)

- The Breeding Bird Survey data for North America have a Blue level of credibility. This is the highest level of credibility and reflects data with a moderate level of precision; <http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>.
- In North America the Yellow-headed Blackbird population trend is not statistically significant. From 1966-2012 it declined only slightly at a rate of -0.36% per year; from 2002-2012 it increased slightly to +0.82% per year.

Regional BBS Data (Sauer et al. 2014)

- Regionally, the Yellow-headed Blackbird demonstrates annual population trends shown in Table 3.

Table 3. Yellow-headed Blackbird Regional Population Trends

Region	Credibility Level	1966-2012	Statistically Significant	2002-2012	Statistically Significant
Prairie Potholes	Moderate	+0.58% per year	No	+1.32% per year	No
Prairie Hardwood Transition	Moderate	-3.01% per year	Yes	-4.29% per year	Yes
Boreal Hardwood Transition	Important Deficiency ¹	-6.87% per year	No	-13.10% per year	No

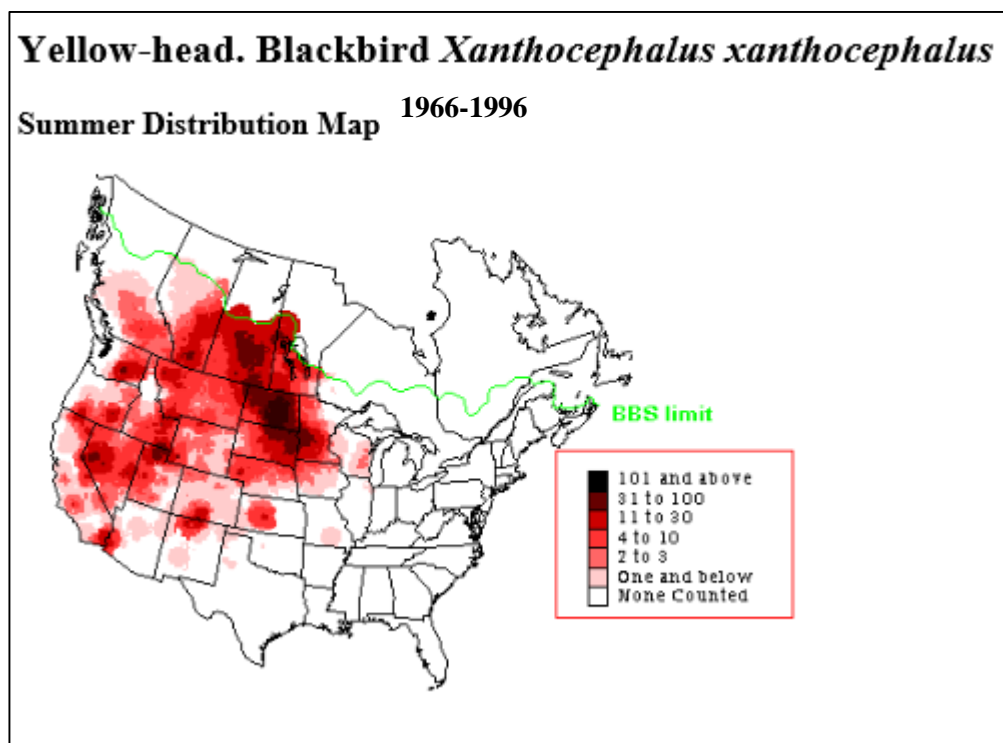
¹Data has an important deficiency including a low regional abundance, small sample size (less than 5 routes with long-term data) and/or the results are so imprecise that a 5% per year change would not be detected over the long-term; credibility level criteria can be found at: <http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>.

Minnesota BBS Data (Sauer et al. 2014)

- The Breeding Bird Survey data for Minnesota has a Blue level of credibility. The data document a statistically significant decline of -3.93% per year from 1966-2012, as well as a statistically significant decline of -5.65% per year from 2002-2012.
- Average # birds/route is 30.6; found on 59 of 82 routes.

- A distribution map generated from BBS data collected from 1966 to 1996 (Figure 3, *Sauer et al. 1997*) documents clearly, when compared to the map in Figure 2, which depicts the birds relative abundance and distribution from 2006-2012, both the range contraction westward in Minnesota and the decreased abundance in the state.

Figure 3. Relative Abundance of the Yellow-headed Blackbird in North American (1966-1996).



Life History Characteristics Relevant to Recovery

Migration: Temperate

Climate Change Vulnerability: Medium (2) (*Butcher 2010*); climate change models predict that the Yellow-headed Blackbird will decrease in both distribution and abundance in Minnesota as the climate warms (*Matthews et al. 2004*).

Home Range and Territoriality: Yellow-headed Blackbirds are often described as being loosely colonial. According to Twedt and Crawford (1995) the birds nest in “grouped” territories when they obtain most of their food within the territory; however, when most of the food is found outside of their territories they nest in loose colonies. In addition, many of the male blackbirds, especially second-year birds, are floaters without an established territory. Territory size varies widely depending on the quality of the habitat. Sizes reported by Twedt and Crawford (1995) range as small as 8 m² to as high as 4,072 m². Red-winged Blackbirds, regular co-inhabitants of the Yellow-headed Blackbird’s nesting marshes, arrive on the nesting grounds earlier but are displaced from their established territories once the Yellow-headed males

return (*Orians and Willson 1964*). In addition, Yellow-headed Blackbirds are polygynous (*Lightbody and Weatherhead 1987*).

Age at First Reproduction: Females breed their first summer after hatching. Males, however, may delay nesting until their second summer but return as “floaters”, without established territories, their first summer (*Twedt and Crawford 1995*).

Nesting Dates: Yellow-headed Blackbirds nest from the middle of May, in southern Minnesota, to the end of June or early July, in the more northern regions (*Roberts 1932*).

Clutch Size: Clutch size ranges from 3-4; occasionally 5 (*Twedt and Crawford 1995*).

Longevity of Adults: One banding study documented a male of 9 years; in captivity one male lived 16 years (*Twedt and Crawford 1995*).

Food: During the breeding season Yellow-headed Blackbirds feed primarily on aquatic insects but during the post-breeding season cultivated grains and weed seeds are the primary food item (*Twedt and Crawford 1995*).

Habitat Requirements and Limiting Factors related to Habitat

Habitat Categorization: Emergent Marsh

Limiting Factors during the Breeding Season

- The single most limiting factor for Yellow-headed Blackbirds appears to be the availability of good quality hemi-marshes.

General Habitat Descriptions

From Birds of North America (Twedt and Crawford 1995):

- The Yellow-headed Blackbird primarily inhabits prairie wetlands, but it is also common in wetlands associated with quaking aspen parklands. Scattered colonies occur on forest edges and on larger lakes in the mixed-wood boreal forest.
- The average area within a territory that is covered by emergent vegetation ranges from 35 to 77% (*Willson 1966*). There are fewer females/male on poorer-quality territories.
- Males establish territories in deeper-water areas of freshwater marshes with robust emergent vegetation, generally cattails or bulrushes. Territories are established from the center to the periphery of marshes. Males are less likely to establish territories when trees or cliffs project >30° above the horizon, being replaced by Red-winged Blackbirds (*Orians 1980*).
- Although *Lightbody and Weatherhead (1987)* found that females settle randomly within available habitat and that males that are more aggressive obtain larger territories, *Orians and Wittenberger (1991)* found female density to be inversely related to vegetation density and the amount of fallen vegetation. Females prefer marshes of intermediate width with moderately dense vegetation and extensive channeling; sparse vegetation provides inadequate support of nests, and dense vegetation without channeling allows predators access (*Orians and Wittenberger 1991*).
- More productive marshes (i.e., with high rates of dragonfly emergence) have higher female densities and more females per male than do less productive marshes.

From Michigan Species Account (Monfils 2004):

- The need for deeper water appears to be a limiting factor as yellow-headed blackbirds are often not found in similar vegetation where water levels fluctuate.

- Nests are only located over water and are fixed either to dead emergent vegetation from the previous season or robust growing vegetation.

From Wisconsin Bird Conservation Initiative Species Profile (Kreitinger et al. 2013):

- The Yellow-headed Blackbird breeds in deep-water marshes, sloughs, forested wetlands, and along lake edges.
- In Wisconsin they are most common in open, lowland marshes.
- They are colonial nesters with colony sizes in Wisconsin varying from several to >100 pairs.
- Nests are attached to cattails, bulrushes, or reeds above deeper water, ranging from 16-76 cm in Wisconsin.
- Competitive interactions with Red-winged Blackbirds typically result in the Red-winged Blackbirds being forced into marsh edge habitats containing shallower water.
- Yellow-headed Blackbirds forage within wetlands and surrounding open agricultural and upland areas.

Threats

From Wisconsin Bird Conservation Initiative Species Profile (Kreitinger et al. 2013):

- Agricultural drainage and urban development threaten remaining wetland ecosystems and local populations of wetland-associated birds.
- Human activities that alter hydrology and introduce invasive plant species also threaten wetland habitats.
- The colonial nature of Yellow-headed Blackbirds makes them vulnerable to local extinctions.
- Events such as lethal control for crop depredation may have devastating consequences to local breeding populations if applied at colony or roost sites.
- The drainage of marshes has led to the disappearance of colonies in Wisconsin, but also has resulted in geographic isolation of the Wisconsin population. Wisconsin is at the eastern edge of the Blackbird's breeding range. Thus, without connectivity of wetlands, the migration corridor is compromised and recruitment to the population is likely reduced.

Best Management Practices

From Michigan Species Profile (Monofils 2004):

- Previous research has indicated that marshes with a 50:50 ratio of open water to emergent vegetation, often termed hemi-marshes, attract the highest densities and diversities of wetland birds, including Yellow-headed Blackbirds.
- Orians (1980) found that the value of emergent vegetation patches to breeding Yellow-headed Blackbirds decreased with increased stem densities. Increased stem density may reduce aquatic insect production and Yellow-headed Blackbird encounter rates with prey.
- Wildlife biologists should manage wetlands, especially those with water level control structures, for the hemi-marsh state.
- Best management practices, such as filter strips, no-till farming, and conservation tillage, should be encouraged in watersheds containing suitable wetlands to help protect valuable habitats from pollution.

From Wisconsin Bird Conservation Initiative Species Profile (Kreitinger et al. 2013):

- Management efforts should focus on preserving all existing emergent deep-water wetlands, but particularly those harboring breeding colonies.

- At colony sites, managers should consider maintaining water depth at 30 cm or more and promoting the growth of tall, robust emergent vegetation such as cattail and hard-stem bulrush.
- The continuation of wetland management, protection, and restoration efforts such as the Wetlands Reserve Program, Partners for Fish and Wildlife, and North American Wetland Conservation Act, will benefit this species.
- Wetland restoration efforts should target areas in Wisconsin and surrounding states that will increase connectivity and re-establish a migratory corridor.

From Partners in Flight Physiographic Region 16 (Bird Conservation Region 23) Plan; recommendations for Wetland Birds relevant to Yellow-headed Blackbirds (Knutson et al. 2001):

- Increase wetland area by 10% in all states in Partners in Flight Physiographic Region 16.
- Identify and maintain deep-water wetlands >20 ha (50 acres) in size.

From Partners in Flight Physiographic Region 40 (Bird Conservation Region 11) Plan; recommendations for Wetland Birds (Fitzgerald et al. 1998):

- Preservation and restoration of larger wetlands may need to be emphasized more in the southern and eastern portions of the Prairie Pothole Region.

Gaps in Knowledge

From Wisconsin Bird Conservation Initiative Species Profile (Kreitinger et al. 2013):

- More information is needed on habitat use, range, and behavior during winter.
- The absence of colonies in apparently suitable habitat needs further study.
- At known Wisconsin colony sites, studies documenting recruitment rate, reproductive success and adult survival would help to identify limiting factors.

From Birds of North America (Twedt and Crawford 1995):

- Information on the different metabolic rates of Yellow-headed Blackbirds and other Icterids may provide insight into differential timing of migration.
- Little is known about habitat use, range, and behavior during winter.
- Breeding site fidelity of females and fidelity to natal site should be investigated.

MINNESOTA CONSERVATION PLAN

Conservation Goal

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

Background: At the national level, the 2004 Partners in Flight (PIF) population objective for the Yellow-headed Blackbird (*Rich et al. 2004*) was to maintain the then current population estimate of 23,000,000 birds in North America and the estimated 980,000 birds in Minnesota. Although, as noted earlier, the national population remains relatively stable (declining an average of 0.36% per year from 1966-2012 and increasing an average of 0.82% per year since 2002), in the eight years since the PIF report was published the North American population estimate is now projected at approximately 11,000,000 birds with an estimated 300,000 birds in Minnesota. The small annual population decline has contributed some to this dramatic decline of 54%, however the primary reason is the improvement in the population model used to derive the estimate by changing the pair adjustment factor from 2.00 to 1.00 (see Table 2). Now the model more accurately accounts for the species' polygynous breeding behavior as well as the fact that adult males do not breed until their second year; even then, they may opt not to breed in a given year.

In contrast to the national scenario, Yellow-headed Blackbirds in Minnesota have declined an average of 3.93% per year since 1966. At a minimum, a 3.93% decline since 1966 represents an overall 86% population decline for Yellow-headed Blackbirds in the state in the past 46 years (1966-2012). And the rate of decline has only increased in recent years to 5.65% per year (2002-2012). Only three species have experienced a higher annual decline in the state since 2002: 1) Grasshopper Sparrow (-9.21% per year); 2) Western Meadowlark (-8.23% per year); and 3) Ruffed Grouse, a cyclical species (-7.47% per year).

Given the blackbird's overall decline in Minnesota, simply maintaining the current population is not a sufficient conservation goal. Instead, this document proposes to use the same criteria that Partners in Flight used to establish population goals at the national level (*Rich et al. 2004*) to delineate a population objective for Minnesota. The PIF goal was to double the current population, over the next 30 years, for all species that have declined 50% or more since the initiation of the federal Breeding Bird Survey. That is the goal adopted by this conservation plan for Yellow-headed Blackbirds in Minnesota. This would require an increase of at least 2.5% per year as monitored by the Federal Breeding Bird Survey in Minnesota in the next 30 years.

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: Doubling Minnesota's Yellow-headed Blackbird population from its current estimated population of 300,000 individuals (see above) to approximately 600,000 in 30 years would require an average annual increase of at least 2.5% per year.

Actions Needed for Conservation

Inventory and Assessment Needs:

- Given the continuing annual decline in Minnesota's Yellow-headed Blackbird population, it is important to assess whether the species continues to nest in areas where it has been confirmed breeding in the recent past.

Action: Confirm the breeding status of Yellow-headed Blackbirds on the 14 Important Bird Areas where they have been documented nesting in the past (Table 1). Delineate the location and size of each nesting colony found.

Action: Confirm the status of Yellow-headed Blackbirds on those Minnesota IBAs in the Prairie Hardwood Transition Region where they have been reported during the summer breeding season. Delineate the location and size of each nesting colony found.

Background: Yellow-headed Blackbirds have been documented from all of the major ecological regions in Minnesota. However, their decline appears to be most precipitous in the Prairie Hardwood Transition Region where the loss of large hemi-marshes has been pronounced. In addition, they have been selected specifically as a Target Conservation Species for this region by the Blueprint for Minnesota Bird Conservation. As a result, the first priority in further assessing the species status is to focus on those Important Bird Areas located in this transitional zone where they have been observed but nesting has not been confirmed (Table 4).

Table 4. Minnesota IBAs in the Prairie Hardwood Transition Region where Yellow-headed Blackbirds have been reported but Nesting has not been Confirmed.

Arden Hills Army Training Site-Rice Creek	Lake Maria State Park	St. Croix Bluffs
Avon Hills	Lake Pepin	St. Croix Lake
Blufflands-Root River	Lower Minnesota River Valley	Tamarac National Wildlife Refuge
Camp Ripley-Pillsbury-Lake Alexander	Murphy Hanrahan	Twin Cities Mississippi River
Carlos Avery	Northland Arboretum	Vermillion Bottoms-Lower Cannon River
Crane Meadows	North Metro Mississippi River	

Action: Once the Minnesota Breeding Bird Atlas is completed in 2013, visit any new nesting sites that were reported as “Probable” or “Confirmed” and document the exact location of each nesting colony and the approximate number of singing males.

Monitoring Needs

- Continue to monitor the statewide population of Yellow-headed Blackbirds.

Action: Support and encourage volunteer participation in the Federal Breeding Bird Survey in Minnesota so that all of the designated routes are completed, providing the best possible annual assessment of the distribution and abundance of Yellow-headed Blackbirds.

Background: Because the Yellow-headed Blackbird is widely distributed in western and central Minnesota, the Federal Breeding Bird Survey is a reasonably good tool for monitoring the species’ statewide population. As noted above, the level of credibility for the data is “Blue”, which is the highest rating possible.

Action: If Minnesota begins a secretive marshbird survey, akin to that currently being conducted in many other Midwestern states (e.g. Wisconsin and Michigan), then consider including the Yellow-headed Blackbird as one of the target species to monitor.

Background: Several Midwestern states have recently initiated secretive marshbird surveys. Because many marshbirds, like rails and bitterns, are not well-surveyed by the federal Breeding Bird Survey biologists have looked for other methods to collect more robust data for this group of species. A relatively new protocol is now being used in several Midwestern states including Wisconsin, Michigan, Ohio and Missouri (*Soulliere et al. 2012*). The protocol should be examined carefully to assess whether it is effective and cost-efficient for monitoring Minnesota's marshbird community.

Action: Investigate opportunities to integrate the data gathered by Minnesota's Comprehensive Wetland Assessment Monitoring and Mapping Strategy with information on the status and distribution of Audubon Minnesota's targeted conservation birds that are wetland-dependent, such as the Yellow-headed Blackbird.

Background: In 2006, Minnesota initiated a statewide random survey to track trends in wetland quantity. The Department of Natural Resources (DNR) Resource Assessment Program and the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program assisted with the statistical design of the survey which is briefly described below:

The project involves the periodic acquisition and interpretation of aerial photography on nearly 5,000 permanent sample plots scattered around the state. Wetland gain and loss is determined by comparing subsequent photos of each sample plot using GIS technology.

Wetland quantity measurements are made using photo-interpretation of high-resolution natural color stereo-imagery for randomly selected 1-square mile plots, known as primary sampling units (PSU). The survey uses a cyclical, interpenetrating panel structure based on the Generalized Random Tessellation Stratified (GRTS) design to ensure that random samples are spatially distributed across the state. Imagery is acquired and photo-interpretations are performed for 1,830 PSUs each year. Of these, 1,580 PSUs are assigned to one of three repeating panels and interpreted every third year and 250 PSUs are interpreted every year (http://www.dnr.state.mn.us/eco/wetlands/wstm_prog.html).

Following completion of the first three-year cycle, wetland quantity results will be reported, establishing "baseline" conditions. Repeating the same sampling every three years will allow comparisons with this baseline to determine whether wetland quantity in the state is changing. A companion survey program to assess regional trends in wetland quality or "health" began in 2007.

Minnesota is one of the few states in the nation to initiate such a comprehensive wetland monitoring program. Audubon staff should work with DNR staff to investigate the opportunities to integrate this excellent and robust data source on the status of Minnesota wetlands with the status and distribution of Minnesota's important wetland bird species.

Research Needs

- Improve our understanding of the habitat factors that Yellow-headed Blackbirds use to discriminate among suitable and unsuitable nesting wetlands.

Action: Audubon Minnesota should encourage the initiation of research to improve our understanding of what habitat qualities are most important to Yellow-headed Blackbirds for selecting wetlands suitable for nesting.

Background: Current research suggests that Yellow-headed Blackbirds require large hemi-marshes; hemi-marshes are defined as wetlands that have a significant amount of emergent vegetation (bulrushes and cattails) that are present as dense stands, interspersed among open water. Generally, roughly 50% of the area is in open water and 50% is stands of emergent vegetation. Are these the most important habitat factors for Yellow-headed Blackbirds? Is size of the wetland also important? Is the productivity of the wetland, measured in terms of availability of aquatic insects, equally important?

Action: Based on research that delineates specific habitat requirements, develop a set of Best Management Practices for the Yellow-headed Blackbird.

Background: The Best Management Practices described earlier in this document are very general; clearer delineation of the species' habitat requirements and those management actions that benefit Yellow-headed Blackbirds is needed.

Habitat Protection Needs

- Insure that opportunities to protect and restore deep water marshes and hemi-marshes are maximized.

Action: Work with conservation partners throughout the state to protect approximately 80,000 acres of wetland habitat in Minnesota (Table 5).

Background: Habitat protection goals displayed in Table 5 are drawn from two documents to establish the conservation objectives for Minnesota's Yellow-headed Blackbird population. The first document is the Waterbird Habitat Conservation Strategy for the Upper Mississippi Valley/Great Lakes Joint Venture (*Soulliere et al. 2007*). The Joint Venture established habitat conservation goals for guilds of waterbirds that utilize five different habitats, including wet meadows with open water, islands, and herbaceous wetlands with shrub/forest. Yellow-headed Blackbirds use both deep water marshes and hemi-marshes or shallow, semi-permanent marshes. As a result, this document includes the habitat protection and restoration goals established by the Joint Venture for both types of wetland habitat. The specific habitat protection goals for these wetlands in each Minnesota Bird Conservation Region located within the Upper Mississippi Valley/Great Lakes Joint Venture are shown in Table 6.

Table 5. Wetland Protection Goals for Minnesota Yellow-headed Blackbirds

Joint Venture Region of Minnesota	Habitat	Minnesota Protection Goal
Upper Mississippi Valley/Great Lakes ¹	Deep Water Marsh	4,070 acres (1,648 ha)
	Shallow, semi-permanent marsh; hemi-marsh	1,415 acres (573 ha) ³
<i>Subtotal</i>		<i>5,485 acres</i>
Prairie Potholes	Wetlands in Prairie Core Areas, and Corridors ²	74,234 acres
Total		79,719 acres

¹ In Minnesota the Upper Mississippi Valley/Great Lakes Joint Venture Region encompasses Audubon Minnesota's Boreal Hardwood Transition Region and most of the Prairie Hardwood Transition Region; this is roughly equivalent to Partners in Flight Bird Conservation Regions 12 (Boreal Hardwood Transition), 22 (Eastern Tallgrass Prairie) and 23 (Prairie Hardwood Transition) in Minnesota (Figure 4).

²The totals above are specifically the goals for the number of acres of permanently protected wetlands needed within core areas and corridors between the cores; see Figure 5.

³ This number is incorrectly reported in Soulliere et al. (2007) as 273 ha (there was an addition mistake in the table); all habitat goals in Soulliere et al. (2007) are reported in hectares but have been converted here to acres as well.

Table 6. Deep Water Marsh and Hemi-Marsh/Semi-Permanent Wetland Habitat Protection Goals for the Yellow-headed Blackbird in the Upper Mississippi Valley/Great Lakes Joint Venture region of Minnesota

Partners in Flight Bird Conservation Region	Wetland Habitat	Protection Goals
Boreal Hardwood Transition (12)	Deep Water Marsh	1,971 acres (798 ha)
	Shallow, semi-permanent marsh; hemi-marsh	133 acres (54 ha)
<i>Subtotal</i>		<i>2,104 acres</i>
Prairie Hardwood Transition (23) ¹	Deep Water Marsh	2,099 acres (850 ha)
	Shallow, semi-permanent marsh; hemi-marsh	1,282 acres (519 ha)
<i>Subtotal</i>		<i>3,381 acres</i>
Total		5,485 acres

¹Includes portions of both BCR22 (Eastern Tallgrass Prairie) and 23 (Prairie Hardwood Transition) in Minnesota

The second document used to establish the habitat protection goal is the Minnesota Prairie Landscape Conservation Plan (*Minnesota Prairie Plan Working Group 2010*). Because explicit habitat goals have not been established for the Prairie Potholes Joint Venture region, this document is an excellent surrogate. The area covered by the plan closely corresponds to the boundaries of the Prairie Potholes Joint Venture region in Minnesota. The boundaries of both Joint Ventures and the Minnesota Prairie Region covered by the Prairie Conservation Plan are shown in Figure 4. Together, the goals established by the Upper Mississippi Valley/Great Lakes Joint Venture and Minnesota's Prairie Landscape Conservation Plan nearly cover the entire state of Minnesota.

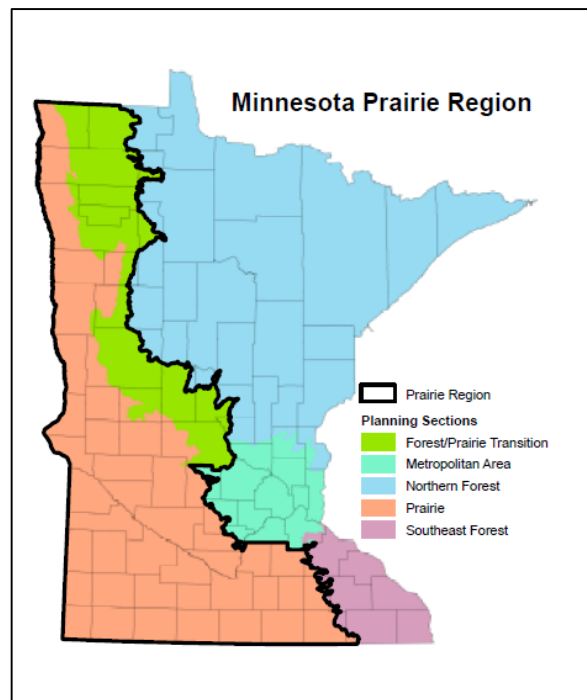
The Prairie Plan specifically delineates and maps two types of areas for native prairie, grassland and wetland protection and restoration:

- **Core areas** that are “large landscapes (5,000 to 300,000 acres) that retain some features of a functioning prairie landscape and include 71% of Minnesota’s remaining native prairie”; and
- **Corridors** that are “linear stretches of habitat six miles wide that connect the core areas to each other.”

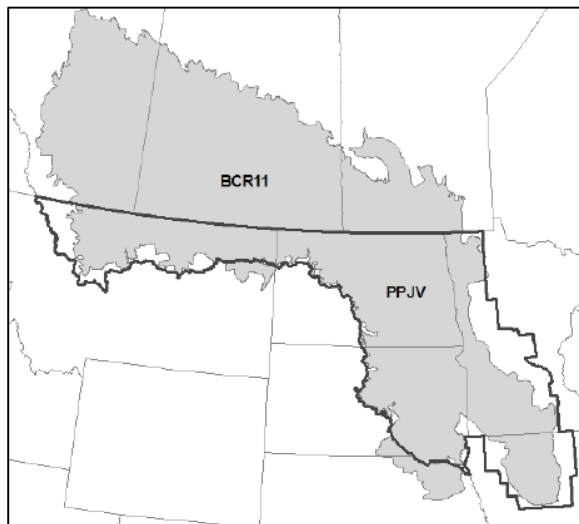
Large habitat complexes (9 mi²) are identified within each corridor and all the land outside the core areas and corridors is referred to as the agricultural matrix. Figure 5 illustrates the core areas, corridors and larger agricultural matrix.

Minnesota's Prairie Landscape Conservation Plan also establishes protection acreage goals for the core areas, corridors and the larger agricultural matrix, specifying what portion of each goal should be attained with acres that are permanently protected versus acres that are voluntarily protected. Ideally, Minnesota's conservation community will successfully achieve all the plan's goals, benefitting the Yellow-headed Blackbird and many other grassland and wetland species. For the purposes of this Conservation Plan, however, we have focused only on the protection goals established for permanently protected wetlands (i.e. through fee acquisition or permanent conservation easements) in the core areas and corridors shown in Table 7 (highlighted in green). The acres that are to be permanently protected within the agricultural matrix and those that are to be voluntarily protected within the core areas, corridors and matrix were reported as a combined total for both grasslands and wetlands, so they are not included. In addition, although not all wetland types are suitable for Yellow-headed Blackbirds, the Prairie Plan does not establish goals for different wetland types so this document adopts the overall wetland protection goals, with the caveats stated above, for Minnesota's Prairie Region.

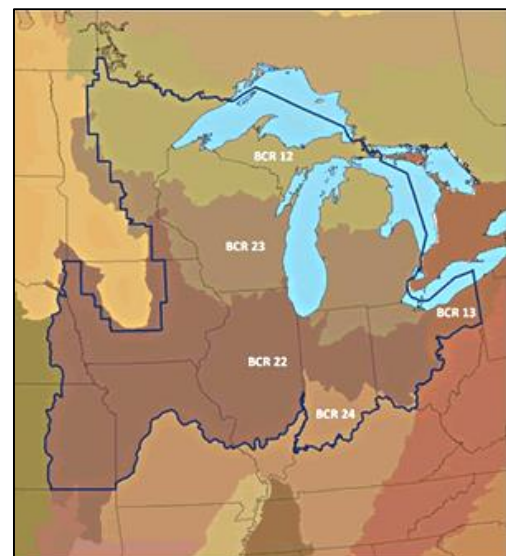
Figure 4. Comparison of the Joint Venture Region Boundaries and Minnesota's Prairie Landscape Region



Area covered by Minnesota's Prairie Landscape Conservation Plan (dark black line)



Boundary of the Prairie Pothole Joint Venture Region (PPJV) and Bird Conservation Region 11 (Prairie Parkland Region)



Boundary of the Upper Mississippi Valley/Great Lakes Joint Venture Region (dark blue line) with Bird Conservation Regions 12, 13, 22, 23 and 24

Figure 5. Prairie Core Areas, Corridors and Agricultural Matrix from Minnesota's Prairie Landscape Conservation Plan

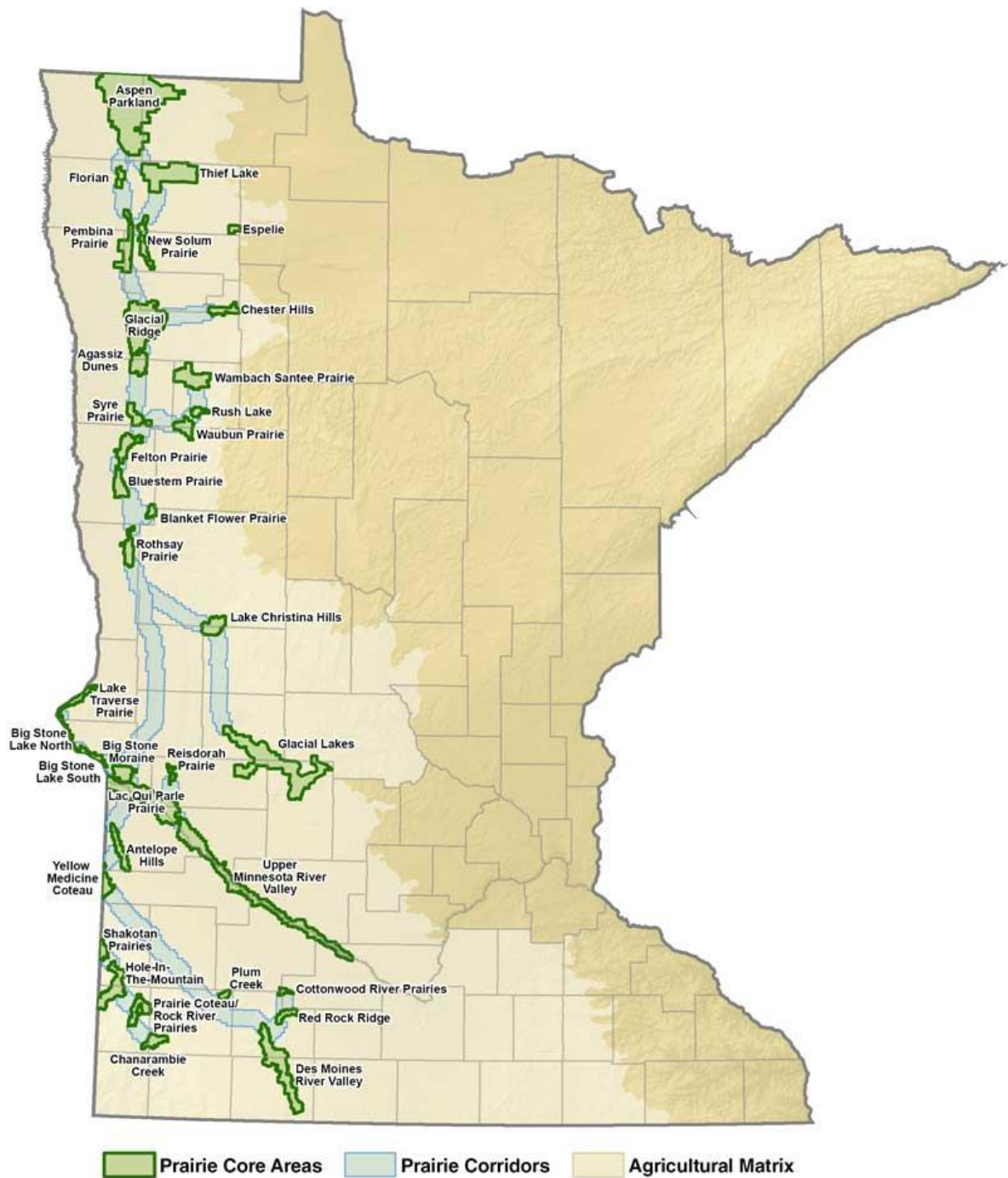


Table 7. Wetland Protection Goals for the Prairie Pothole Region of Minnesota (from the Minnesota Prairie Landscape Conservation Plan)

Conservation Action	Prairie Landscape Conservation Areas	Specific Conservation Action	Acreage Goals by Habitat ¹	
			Wetlands	Grasslands & Wetlands
Protection	Core Areas	Acquisition/Easements	60,837 acres	
		Voluntary management or conservation contracts		149,022 acres
	Corridor Areas (complexes & general corridors)	Acquisition/Easements	13,397 acres	
		Voluntary management or conservation contracts		39,364 acres
	Matrix Landscape	Acquisition/Easements		523,564 acres
		Voluntary management or conservation contracts		1,221,650 acres
Protection Total			74,234 acres	1,933,600 acres

¹Some subtotals for conservation actions in the Prairie Plan do not reflect the totals reported in the plan; this table uses the totals.

Habitat Restoration and Management Needs

- In addition to protecting deep water marshes and hemi-marshes the conservation community needs to aggressively restore and manage wetland habitats.

Action: Work with conservation partners throughout the state to restore approximately 107,000 acres of wetland habitat (Table 8), targeting Priority IBAs and using best management practices summarized in the preceding pages.

Table 8. Wetland Restoration Goals for Minnesota Yellow-headed Blackbirds

Joint Venture Region of Minnesota	Habitat	Minnesota Restoration Goal
Upper Mississippi Valley/Great Lakes	Deep Water Marsh	2,038 acres (825 ha)
	Shallow, semi-permanent marsh; hemi-marsh	1,415 acres (573 ha) ¹
<i>Subtotal</i>		<i>3,453 acres</i>
Prairie Potholes	Wetlands in Prairie Core Areas, and Corridors	103,608 acres
Total		107,061 acres

¹ As noted in Table 5, this number is incorrectly reported in Soulliere et al. (2007) as 273 ha.

Background: The wetland restoration goals are derived from the same documents as the protection goals. The only difference is that the Minnesota Prairie Landscape Conservation Plan does not distinguish between restored wetlands that are permanently protected or voluntarily protected. The plan simply states that if state funds are used for restoration it should take place

only on public lands or on private lands subject to a conservation easement, deed restriction or contract.

Table 9 delineates the number of acres of wetland to be restored in Bird Conservation Regions 12 and 23, by wetland type, in Minnesota. Table 10 delineates the number of acres of wetland to be restored in the Core Areas and Corridors within Minnesota's Prairie Landscape Region; the restoration goal for the agricultural matrix was a combined goal for both wetlands and grasslands so was not included.

Table 9. Deep Water Marsh and Hemi-Marsh/Semi-Permanent Wetland Restoration Goals for the Black Tern in the Upper Mississippi Valley/Great Lakes Joint Venture region of Minnesota

Partners in Flight Bird Conservation Region	Wetland Habitat	Restoration & Enhancement
Boreal Hardwood Transition (12)	Deep Water Marsh	986 acres (399 ha)
	Shallow, semi-permanent marsh; hemi-marsh	133 acres (54 ha)
<i>Subtotal</i>		<i>1,119 acres</i>
Prairie Hardwood Transition (23)*	Deep Water Marsh	1,052 acres (426 ha)
	Shallow, semi-permanent marsh; hemi-marsh	1,282 acres (519 ha)
<i>Subtotal</i>		<i>2,334 acres</i>
Total		3,453 acres

*Includes portions of both BCR22 (Eastern Tallgrass Prairie) and 23 (Prairie Hardwood Transition) in Minnesota.

Table 10. Wetland Restoration Goals for the Prairie Pothole Region of Minnesota (from the Minnesota Prairie Landscape Conservation Plan)

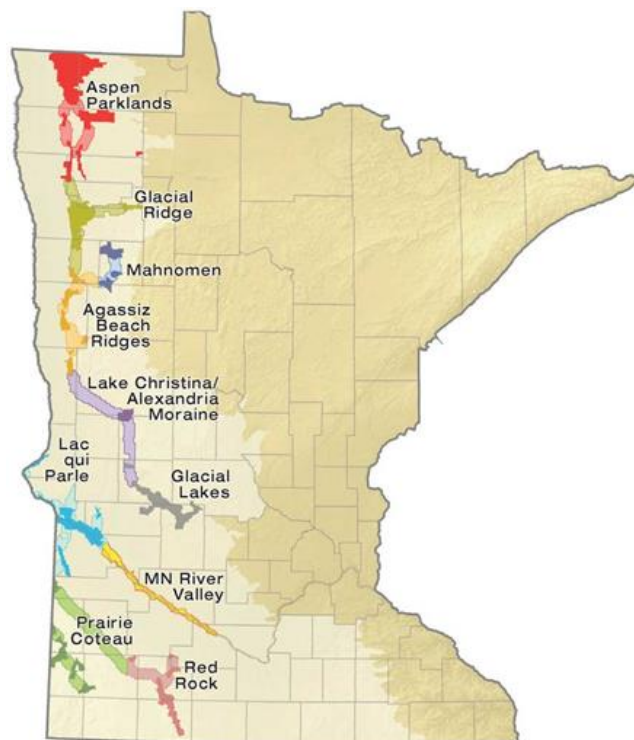
Conservation Action	Prairie Landscape Conservation Areas	Wetland Restoration Goal
Restoration	Core Areas	83,169 acres
	Corridor Areas (complexes & general corridors)	20,439 acres
Restoration Total		103,608 acres

Action: Assess if any of the IBAs that support Yellow-headed Blackbird colonies would benefit from best management practices that would enhance the breeding habitat.

Action: Audubon Minnesota staff shall lead the technical field team responsible for one of the core areas delineated in the Minnesota Prairie Landscape Conservation Plan, the Tallgrass Aspen Parklands, to insure that conservation actions in the region, especially those focused on wetland restoration and management, are guided by the plan.

Background: Implementation of Minnesota's Prairie Landscape Conservation Plan focuses on the establishment of technical field teams in the primary core areas. The teams are composed of state, federal and local resource professionals as well as professionals with conservation organizations. Together they are responsible for insuring that the goals of the plan are achieved. Because of its long-standing interest and engagement in northwest Minnesota, Audubon staff has assumed a leadership role for the Aspen Parklands Technical Team shown in Figure 5.

Figure 6. Minnesota's Prairie Landscape Conservation Plan Technical Teams



Action: Support and collaborate with the Prairie Landscape Conservation Technical Teams in west-central Minnesota, focusing specifically on Important Bird Areas.

Background: Yellow-headed Blackbirds are most abundant (Figure 1) in west-central Minnesota so wetland conservation efforts in this region of the state are particularly important to the species. Audubon Minnesota should collaborate with the Minnesota Prairie Landscape Conservation technical teams in this region (e.g. the Lac qui Parle, Minnesota River Valley and Lake Christina/Alexandria Moraine teams) in areas where Important Bird Areas also occur and advocate for management actions that benefit Yellow-headed Blackbirds.

- Monitor the amount of wetland that is protected and restored and assess if it is sufficient to provide for a sustainable population of Yellow-headed Blackbirds in Minnesota.

Action: Document and monitor the amount of habitat that is protected and restored and assess if it is meeting the goals established for protection and restoration of wetland habitat for the Minnesota portion of the Upper Mississippi River Valley/Great Lakes Joint Venture region.

Action: Work with members of the Minnesota Prairie Landscape Conservation Implementation team to insure that actions to restore Minnesota's wetlands are accurately tracked and monitored and meeting the goals of the Prairie Plan.

Specific Actions for Audubon Chapters: Assist in monitoring local colonies within priority IBAs. Additional details for Audubon Minnesota are shown in Table 11.

Table 11. Yellow-headed Blackbird Minnesota Conservation Plan Action Summary

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

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

Actions Needed for Conservation	Priority	Projected Timeline	Responsible Entity	Others Involved
Inventory and Assessment				
<ul style="list-style-type: none"> Confirm the breeding status of Yellow-headed Blackbirds on the 14 Important Bird Areas where they have been documented nesting in the past (Table 1). Delineate the location and size of each nesting colony found. 	#1	2016	Audubon Minnesota	Audubon Chapters
<ul style="list-style-type: none"> Confirm the status of Yellow-headed Blackbirds on those IBAs in the Prairie Hardwood Transition Region where they have been reported during the summer breeding season. Delineate the location and size of each nesting colony found. 	#2	2016	Audubon Minnesota	Audubon Chapters
<ul style="list-style-type: none"> Once the Minnesota BBA is completed in 2013, visit new nesting sites that were reported as "Probable" or "Confirmed" and document the exact location of each nesting colony and the approximate number of singing males. 	#8	2017	Audubon Minnesota	Audubon Chapters
Monitoring				
<ul style="list-style-type: none"> Support and encourage volunteer participation in the Federal Breeding Bird Survey in Minnesota so that all of the designated routes are completed, providing the best possible annual assessment of the distribution and abundance of Yellow-headed Blackbirds. 	#15	Ongoing	Minnesota Ornithologists Union	Audubon Minnesota
<ul style="list-style-type: none"> If Minnesota begins a secretive marsh bird survey, akin to that currently being conducted in many other Midwestern states (e.g. Wisconsin and Michigan), then consider including the Yellow-headed Blackbird as one of the target species to monitor. 	#9	Next 5-10 years	Audubon Minnesota	Minnesota DNR USFWS
<ul style="list-style-type: none"> Investigate opportunities to integrate the data gathered by Minnesota's Comprehensive Wetland Assessment Monitoring and Mapping Strategy with information on the status and distribution of Minnesota's conservation birds that are wetland-dependent, such as the Yellow-headed Blackbird 	#10	Next 5-10 years	Audubon Minnesota	Minnesota DNR, USFWS
Research				
<ul style="list-style-type: none"> Audubon Minnesota should encourage the initiation of research to improve our understanding of what habitat qualities are most important to Yellow-headed Blackbirds for selecting wetlands suitable for nesting. 	#11	Ongoing	Minnesota DNR	USFWS, University of Minnesota
<i>Continued on following page</i>				

Actions Needed for Conservation	Priority	Projected Timeline	Responsible Entity	Others Involved
Research continued				
<ul style="list-style-type: none"> Based on research that delineates specific habitat requirements, develop a set of Best Management Practices for the Yellow-headed Blackbird. 	#12	2017	Minnesota DNR	USFWS, University of Minnesota
Habitat Protection				
<ul style="list-style-type: none"> Work with conservation partners throughout the state to protect approximately 80,000 acres of wetland habitat in Minnesota. 	#3	Audubon Minnesota	USFWS, MNDNR, BWSR, TNC, Watershed Districts	Audubon Minnesota
Habitat Restoration and Management				
<ul style="list-style-type: none"> Work with conservation partners throughout the state to restore approximately 107,000 acres of wetland habitat (Table 8), targeting Priority IBAs and using best management practices summarized in the preceding pages. 	#5	Ongoing	Audubon Minnesota	Minnesota DNR USFWS, BWSR, TNC, Watershed Districts, NRCS
<ul style="list-style-type: none"> Assess if any of the IBAs that support Yellow-headed Blackbird colonies would benefit from best management practices that would enhance the breeding habitat. 	#7	Ongoing	Audubon Minnesota	Minnesota DNR USFWS, BWSR, TNC, Watershed Districts, NRCS
<ul style="list-style-type: none"> Audubon Minnesota staff shall lead the technical field team responsible for one of the core areas delineated in the Minnesota Prairie Landscape Conservation Plan, the Tallgrass Aspen Parklands, to insure that conservation actions in the region, especially those focused on wetland restoration and management, are guided by the plan. 	#4	Ongoing	Audubon Minnesota	Minnesota DNR USFWS, BWSR, TNC, Watershed Districts, NRCS
<ul style="list-style-type: none"> Support and collaborate with the Prairie Landscape Conservation Technical Teams in west-central Minnesota, focusing specifically on Important Bird Areas. 	#6	Ongoing	Audubon Minnesota	
<ul style="list-style-type: none"> Document and monitor the amount of habitat that is protected and restored and assess if it is meeting the goals established for protection and restoration of wetland habitat for the Minnesota portion of the Upper Mississippi River Valley/Great Lakes Joint Venture region. 	#13	Ongoing	Minnesota Prairie Landscape Implementation Team	Upper Mississippi River Valley/Great Lakes Joint Venture
<ul style="list-style-type: none"> Work with members of the Minnesota Prairie Landscape Conservation Implementation team to insure that actions to restore Minnesota's wetlands are accurately tracked and monitored and meeting the goals of the Prairie Plan. 	#14	Ongoing	Minnesota Prairie Landscape Implementation Team	

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