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Eastern Meadowlark Minnesota Conservation Plan

*Audubon Minnesota
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Eastern Meadowlark Conservation Plan

Sturnella magna

Priority for Minnesota's *Implementation Blueprint for Bird Conservation*

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

Executive Summary

Audubon Minnesota has selected the Eastern Meadowlark 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). The other seven 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 Yellow-headed Blackbird.

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		

The Eastern Meadowlark is an inhabitant of Minnesota's grasslands. Originally confined to native prairies, it has adapted well to hayfields, grassy cropland borders, roadsides, overgrown fields and restored grasslands. In Minnesota it is more prevalent in southeastern and east-central Minnesota, whereas the Western Meadowlark is more abundant in the western half of the state. Nevertheless, large areas of overlap exist. In general, Eastern Meadowlarks prefer more poorly drained grasslands and tolerate a little more woody cover. Distinguishing the two species from one another by sight alone can be challenging. Songs of the territorial males, however, are quite distinct and are usually a good feature to depend upon for identification.

The Eastern Meadowlark has declined an average of 1.61% per year in Minnesota since the federal Breeding Bird Survey began in 1966, for a total decline of approximately 53%. The loss and degradation of grassland habitats is the primary culprit. Like other grassland species, the loss of over 400,000 acres of Conservation Reserve Program (CRP) grasslands since 2007, is a major concern for a species already experiencing population declines.

This conservation plan is divided into two parts. The first provides background on the Eastern Meadowlark, 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 Audubon Minnesota Important Bird Areas where nesting has been documented or is suspected and to support the grassland protection and restoration goals established by the Upper Mississippi River/Great Lakes Joint Venture for Minnesota and by Minnesota's Prairie Landscape Conservation Plan, with a special focus on Important Bird Areas in the Prairie Hardwood Transition region.

Introduction

The Eastern Meadowlark 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* (Minnesota Department of Natural Resources 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 Eastern Meadowlark was selected to represent prairie grassland habitats. A complete list of the other priority birds and conservation targets in the Prairie Hardwood Transition Region can be found in the *Implementation 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 for those Target Conservation Species that were the Highest Level Priority in the region: the Red-headed Woodpecker, Cerulean Warbler, Eastern Meadowlark and Yellow-headed Blackbird.

Background

Status

Legal Status: None

Other Status Classifications:

1. National
 - On National Audubon's list of Common Birds in Decline (72% decline from 1966-2006) (*National Audubon 2007*).
 - Identified by Partners in Flight (PIF) Tri-National as a Common Species in Steep Decline (59% of the population has been lost since monitoring began in 1966; Tri-National Plan was published in 2010) (*Berlanga et al. 2010*).
 - U.S. Fish and Wildlife Service Focal Species in 2005 (*U.S. Fish and Wildlife Service 2005*); the species was not listed for the period 2012-2016.
2. Regional
 - U.S. Fish and Wildlife Service Bird of Management Concern in the Midwest Region (*U.S. Fish and Wildlife Service 1995*).

- A Focal Species for the Upper Mississippi River/Great Lakes Joint Venture Region (*Potter et al. 2007*).
- Partners in Flight Bird Conservation Region 22 (Eastern Tallgrass Prairie): Continental Concern and Regional Concern Species: Action is Critical Recovery (*Rich et al. 2004*).
- Partners in Flight Bird Conservation Region 23 (Prairie Hardwood Transition): Continental Concern and Regional Concern Species: Action is Management (*Rich et al. 2004*).

3. Minnesota

- Minnesota Species in Greatest Conservation Need (*Minnesota Department of Natural Resources 2006*); it has also been proposed to remain on the list of Species in Greatest Conservation Need in 2013.
- Identified by Partners in Flight as a priority species in Minnesota (*Rosenberg 2004*).

Range

Historical Breeding Range: The Eastern Meadowlark is broadly distributed throughout the eastern United States south into portions of Central America. Throughout the year it can be found as far west as central Texas north through Oklahoma, eastern Kansas and Iowa, east through the Ohio River Valley, and throughout the southeastern U.S., south through Mexico. A somewhat disjunct population can be found in northern Texas and southern New Mexico and Arizona. During the summer breeding season, the meadowlark can also be found in the Great Lakes states, from eastern Minnesota east to southern Quebec, Nova Scotia and the New England states (*Jaster et al. 2012*, Figure 1).

In Minnesota, T.S. Roberts (1932) described the Eastern Meadowlark's range as occurring regularly within a "narrow area in the eastern part of the state, bounded on the west by an approximate line running from western Mower County, on the Iowa state line, northwest to Le Sueur County, thence north to western Hennepin County, then northeast through Isanti County to Duluth, and probably including a narrow strip along the north shore of Lake Superior". It had recently expanded northwest onto the Iron Range in St. Louis County.

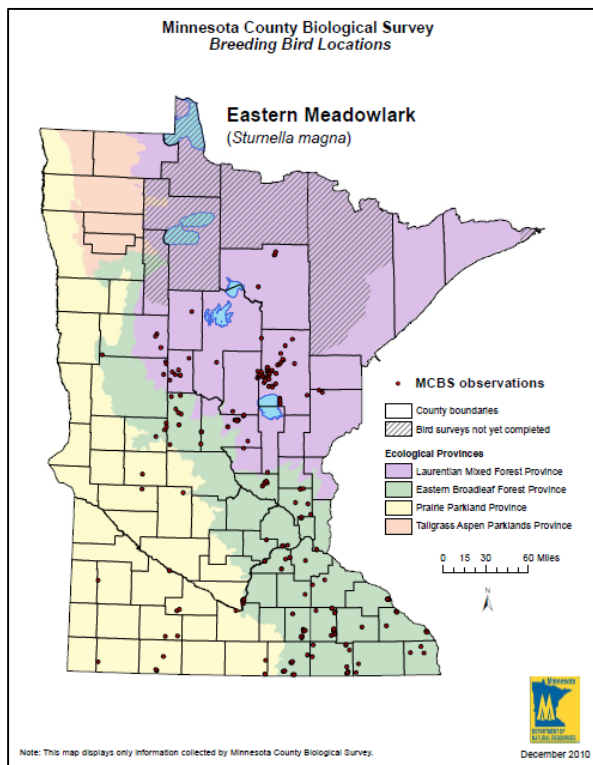
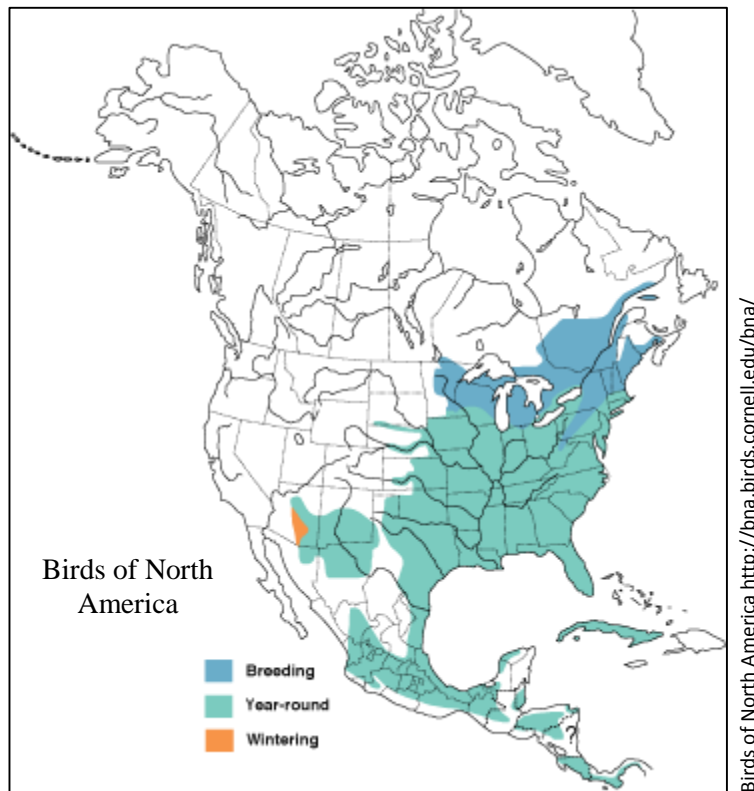
Current Distribution: In the 1960s, the Eastern Meadowlark expanded its range westward in Kansas and the central Texas panhandle; it also expanded its range in Costa Rica and Panama as forests were cleared for agriculture (*Jaster et al. 2012*). In Minnesota it has slowly expanded its range westward with nesting now reported from Blue Earth county in the south central region of the state as well as from Ottertail, Wadena and Todd counties in the west-central region (*Minnesota Ornithologists Union 2014*).

Summary of Presence on Minnesota Important Bird Areas: Eastern Meadowlarks have been documented as present either as a summer resident or migrant on 48 of the 57 currently designated Important Bird Areas (IBAs) in Minnesota. Among the 48, they only have been confirmed breeding at ten IBAs listed in Table 1. Among the 48 IBAs where Eastern Meadowlarks have been reported are a number of western grasslands (such as Felton Prairie, Bluestem-Buffalo River State Park and Rothsay Prairie) where both Eastern and Western Meadowlarks have been reported.

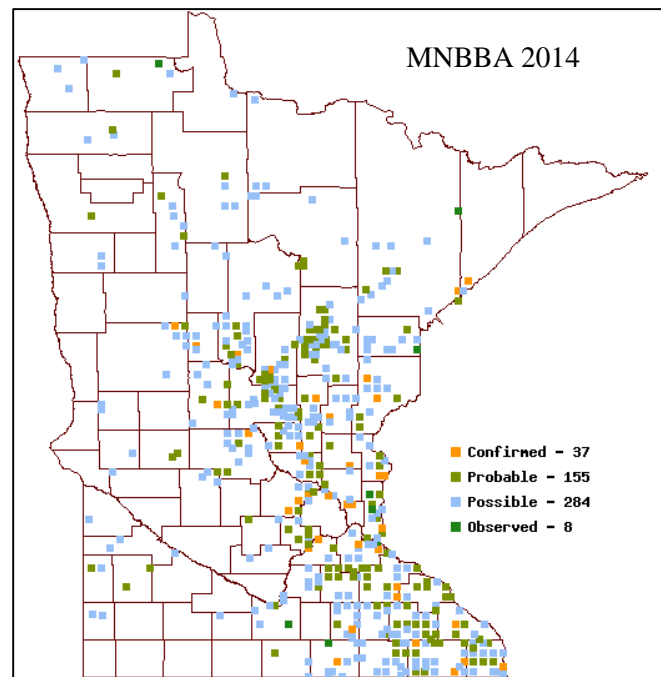
Table 1. Audubon Minnesota's Important Bird Areas with Breeding Eastern Meadowlarks

Chippewa Plains	Sherburne National Wildlife Refuge	Upper Mississippi River National Wildlife Refuge
Des Moines River	South-Central North Shore	Whitewater Valleys
Kettle River-Banning State Park	St. Croix - Greater Wild River	
Murphy Hanrehan Park	Twin Cities Mississippi River	

Figure 1. Eastern Meadowlark Distribution Maps



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

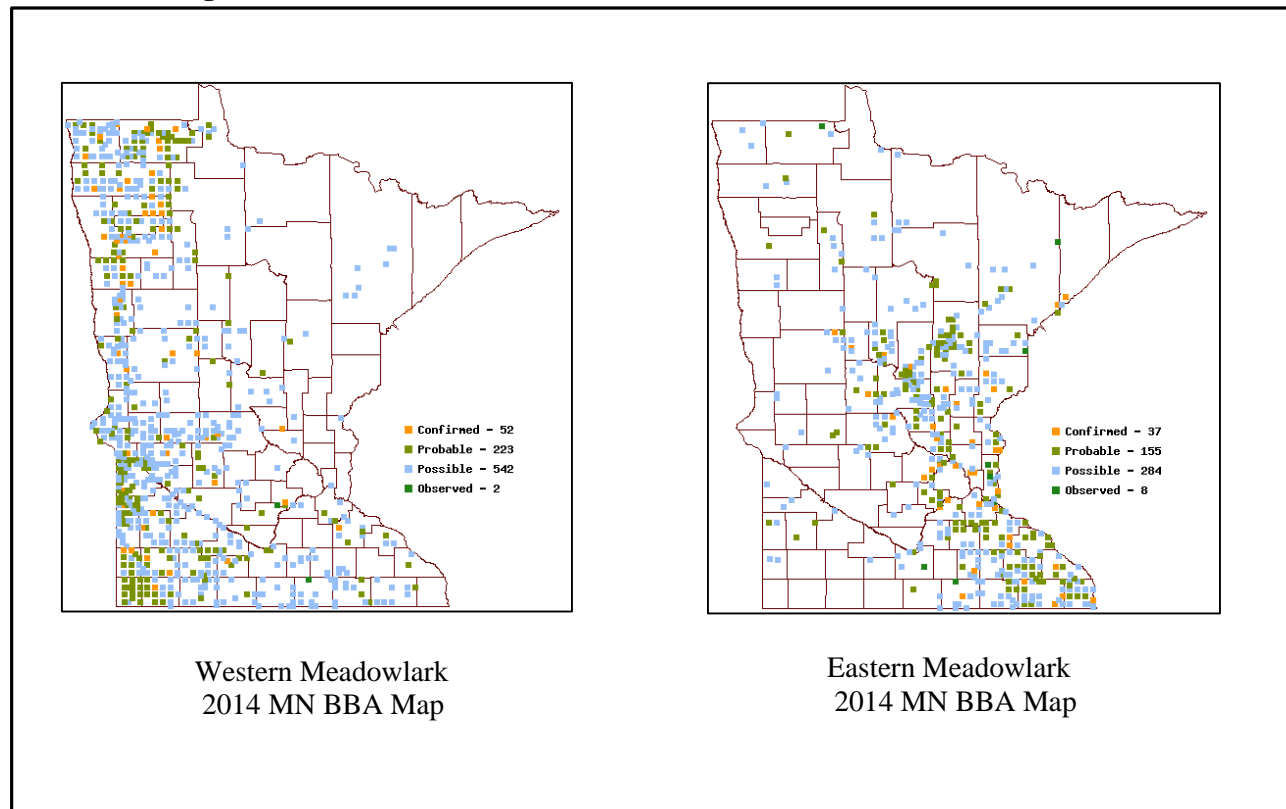


MN Breeding Bird Atlas <http://www.mnbba.org/>

Eastern Meadowlarks and Western Meadowlarks: Identification Challenges

Distinguishing Eastern Meadowlarks from Western Meadowlarks is one of the most difficult field identification challenges for bird observers. This can be a particular challenge in Minnesota because there is a broad region of overlap between the two species, particularly in southeastern and central Minnesota (Figure 2).

Figure 2. Distribution of Western and Eastern Meadowlarks in Minnesota



Standard field guides, such as Peterson (1980) and National Geographic (1983), simply note that the species are ‘nearly identical’ and point to the paler coloration of the Western Meadowlark and that the yellow color of the throat reaches higher into the cheek, or malar region than on the Eastern Meadowlark. Generally, the head stripes on the Eastern Meadowlark have more contrast than those on the Western. Sibley (2000) provides a more detailed treatment of the subtle difference, adding that:

- Eastern Meadowlarks tend to have a rufous tinge to their wing feathers;
- The Eastern Meadowlark’s flanks tend to be buffy with long, continuous streaks of black; in contrast, the Western Meadowlark has whiter flanks and the streaks of black appear broken; and
- The tail of the Eastern Meadowlark has slightly larger patches of white on the outer tail feathers than the Western.

As helpful as these diagnostic criteria may seem, Eckert (2006) notes that exceptions to each have been observed; for example, it is not uncommon for Eastern Meadowlarks to have white flanks. In general,

plumage differences between Western and Eastern Meadowlarks can be very subtle or difficult to discern, especially if the bird is far away, suddenly flushed from the ground, or seen in poor light conditions.

The gold standard for distinguishing the two species from one another has been their songs and call notes. The Eastern Meadowlark's primary song is a phrase of four simple, clear, slurred notes with no complex gurgling sounds (Sibley 2000). Its' call note sounds like a short, harsh 'dziit' sound. In contrast, the primary song of the Western Meadowlark begins with a few clear whistles followed by a descending and complex bubbling song; its call note is a more musical "pluk" or "chuck."

As straightforward as this distinction may seem, there are challenges. As Sibley (2000) notes, individual birds may learn and imitate other songs of nearby species. Since the range of Eastern and Western Meadowlarks overlap in Minnesota, the two birds can learn one another's song. For example, in Wisconsin, there is at least one report of a male Eastern Meadowlark, breeding in an area where Western Meadowlarks co-occurred, singing elements of both the Eastern and Western Meadowlark song (Jaster et al. 2012). According to Sibley, these imitations are usually a poor imitation and often intermediate in pitch and not repeated continuously. So, it helps to listen to a meadowlark for an extended period to ensure proper identification. Jaster et al. (2012) believes that these cases of song imitation are rare. Nevertheless, because population estimates and population trends are based on the Breeding Bird Survey, which relies heavily on song identification for a short three minute interval at each stop, these data may be less reliable in areas of extensive overlap.

Eckert (2006) notes that habitat also can be helpful distinguishing the two species in Minnesota. Eastern Meadowlarks tend to prefer more mesic grasslands with higher cover and are often present in smaller fragments that may include some small trees and shrubs. Western Meadowlarks, on the other hand, tend to prefer larger, drier grasslands and fields with shorter cover.

The Eastern Meadowlark was selected as a Target Conservation Species because it has declined significantly in the Prairie Hardwood Transition region across the Midwest and is a good target for conservation of grasslands in this region of the state where it is more abundant. Although the Western Meadowlark was not selected as a Target Conservation Species it is considered among the highest priority species in the Prairie Hardwood Transition region, and is a high priority species in the Prairie Parkland region and the Tallgrass Aspen Parkland region (Table 2) where it has experienced dramatic population declines. So, despite the challenges distinguishing the two species, and the small difference in their habitat preferences, grassland conservation measures throughout the state will benefit both priority grassland species.

Table 2. Priority Rankings for both Eastern and Western Meadowlarks in Minnesota's Ecological Regions

Ecological Region	Priority Ranking by Minnesota's Implementation Blueprint for Bird Conservation		
	Highest Level Priority	High Level Priority	Moderate Level Priority
Boreal Hardwood Transition			
Prairie Parkland		Western Meadowlark	Eastern Meadowlark
Tallgrass Aspen Parklands		Western Meadowlark	
Prairie Hardwood Transition	Eastern Meadowlark Western Meadowlark		

Population Numbers

National

- In 2004, the population estimate for the U.S. and Canada was 11,000,000 (*Rich et al. 2004*). In 2012, the U.S. and Canada population estimate was 22,000,000 (*Partners in Flight Science Committee 2013*).

As noted in other species plans that comprise *Minnesota's Implementation Blueprint for Bird Conservation*, a doubling of the population in less than 10 years appears incongruous with a species that has demonstrated an average annual decline since population monitoring began in 1966. The difference can be explained by changes that were made to the model used to derive population estimates in 2004 for all landbirds monitored by the BBS. 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 the population estimates for all landbirds in 2012:

The methodology for these initial PIF landbird population estimates are 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 Eastern Meadowlark model are shown in Table 3. The Time of Day Adjustment did not change between 2004 and 2012. The Pair Adjustment was reduced from 2.00, which assumes there is one female for each singing male, to 1.75. The latter number reflects the fact that the Eastern Meadowlark is often polygynous. Field studies have documented that nearly 40-60% of the males in a given population have two mates, rarely three (*Jaster et al. 2012*). This change would result in a small decrease in the estimated population size.

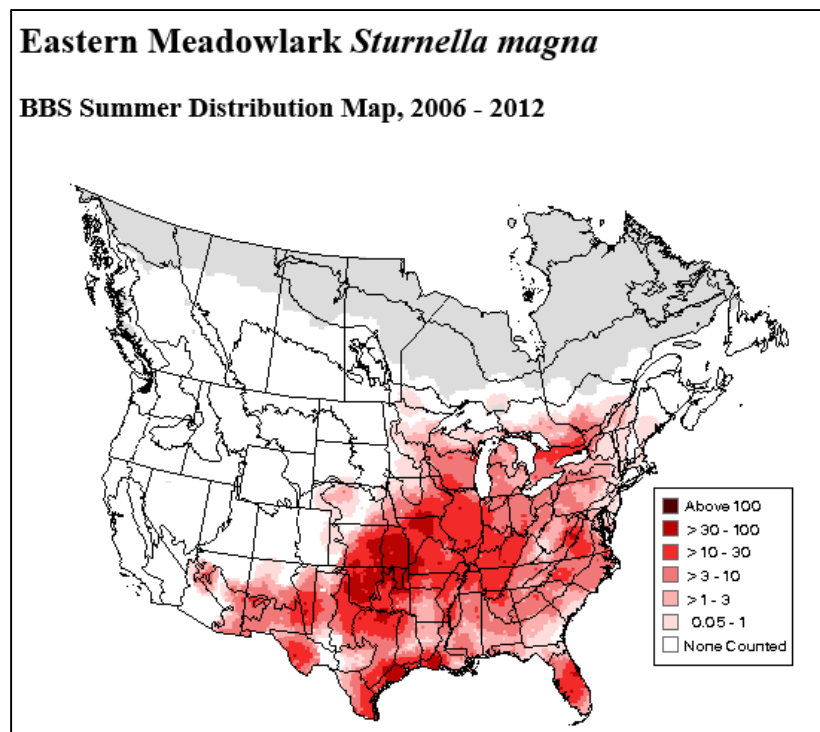
The biggest change, however, was in the Detection Distance which was reduced from 400 meters down to 200 meters. This significant change is responsible for doubling of the population estimate since 2004, despite the continued population decline as monitored by the Breeding Bird Survey.

Table 3. Adjustment Factors used for the Grasshopper Sparrow Population Estimate

Year	Detection Distance	Pair Adjustment	Time of Day Adjustment
2004	400 meters	2.00	1.19
2012	200 meters	1.75	1.19

- Continental Population Objective: Partners in Flight's North American Landbird Conservation Plan published in 2004 (*Rich et al. 2004*) stated that the objective is to double the Eastern Meadowlark population at current levels and prevent further decline.
- The relative abundance of breeding birds from 2006-2012, assessed by the Federal Breeding Bird Survey (*Sauer et al. 2014*) is illustrated below.

Figure 3. Relative Abundance of the Eastern Meadowlark in North America, 2006-2012.



Regional

- Current population (2012) in Bird Conservation Region 11 (Prairie Potholes): 40,000 (*Partners in Flight Science Committee 2013*).
- Current population (2012) in Bird Conservation Region 23 (Prairie Hardwood Transition): 600,000 (*Partners in Flight Science Committee 2013*).
- Current population (2012) in Bird Conservation Region 12 (Boreal Hardwood Transition): 400,000 (*Partners in Flight Science Committee 2013*).

Minnesota

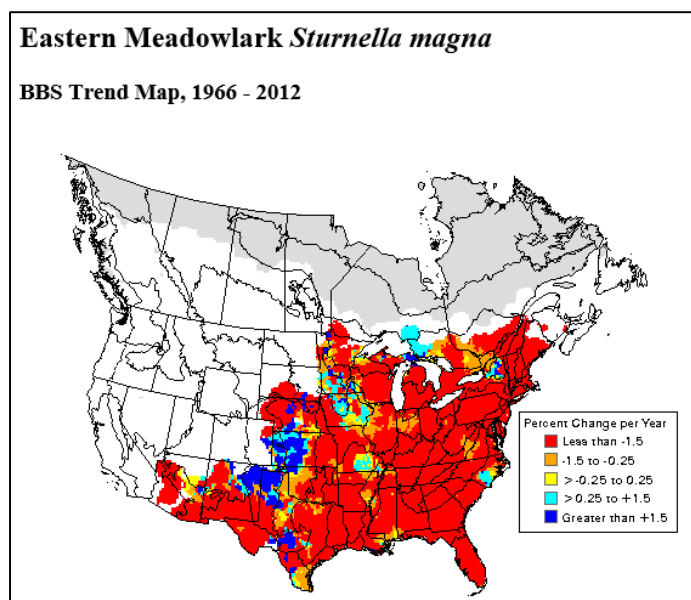
- Minnesota does not include one of the species centers of highest abundance; they occur further to the east and south of Minnesota (Figure 3).
- 3.08% of the Eastern Meadowlark's North American breeding range occurs in Minnesota; 0.20% of its' population (2012) occurs in Minnesota (*Partners in Flight Science Committee 2013*).
- In 2004, the population estimate for Minnesota was 39,000; Target Population was 78,000
 - ✓ Estimated MN population in BCR11 (Prairie Potholes): 4,400; target is 8,800
 - ✓ Estimated MN population in BCR12 (Boreal Hardwood Transition) : 8,600; target is 17,000
 - ✓ Estimated MN population in BCR22 (Eastern Tallgrass Prairie): 1,200; target is 2,400
 - ✓ Estimated MN population in BCR23 (Prairie Hardwood Transition): 25,000; target is 50,000
- In 2012, the population estimate for Minnesota was 70,000
 - ✓ Estimated MN population in BCR11 (Prairie Potholes): 5,000
 - ✓ Estimated MN population in BCR12 (Boreal Hardwood Transition): 30,000
 - ✓ Estimated MN population in BCR22 (Eastern Tallgrass Prairie): 5,000
 - ✓ Estimated MN population in BCR23 (Prairie Hardwood Transition): 30,000

Population Trends

National Breeding Bird Survey (BBS) Data

- The Breeding Bird Survey data for North America have a “Yellow” level of credibility which means the data has some deficiencies including: the abundance of the species is less than 0.1 birds/route (i.e. very low abundance); the sample is based on less than 14 routes; or the results are so imprecise that a 3% change per year would not be detected over the long-term (i.e. the data is very imprecise; <http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>; Sauer *et al.* 2014).
- Knowing this limitation, the Eastern Meadowlark has demonstrated a statistically significant average annual decline throughout its range in North America of 3.41% per year from 1966-2012 and an average annual decline of 3.14% per year from 2002 to 2012.
- The relative breeding density of Eastern Meadowlarks has changed dramatically since the Breeding Bird Survey began in 1966. All the areas in red in Figure 4 have experienced an average decline per year of 1.5% or more.

Figure 4. Breeding Bird Survey Trend Map for the Eastern Meadowlark, 1966-2012.



Regional BBS Data

- Regionally, the Eastern Meadowlark demonstrates annual population trends shown in Table 4.

Table 4. Eastern Meadowlark Regional Population Trends

Region	Credibility Level	1966-2012	Statistically Significant	2002-2012	Statistically Significant
Prairie Potholes	Important Deficiency ¹	-1.68% per year	No	+3.41% per year	No
Prairie Hardwood Transition	Moderate ²	-3.70% per year	Yes	-3.73% per year	Yes
Boreal Hardwood Transition	Moderate	-3.02% per year	Yes	-3.59% per year	Yes

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 (<http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>, Sauer *et al.* 2014).

² Data are of moderate precision; <http://www.mbr-pwrc.usgs.gov/bbs/credhm09.html>).

Minnesota BBS Data

- The Breeding Bird Survey data for Eastern Meadowlarks in Minnesota has a “Yellow” level of credibility.
- The data document a statistically significant decline of -1.61% per year from 1966-2012, as well as a statistically significant decline of -1.96% per year from 2002-2012.
- Average # birds/route is 0.94; found on 52 of 82 Minnesota routes.

Life History Characteristics Relevant to Recovery

Migration: Temperate

Climate Change Vulnerability: Low (1) (Butcher 2010); climate change models predict that the Eastern Meadowlark’s distribution in Minnesota will expand westward and they will increase in abundance (Matthews *et al.* 2004).

Home Range and Territoriality: Male Eastern Meadowlarks maintain a territory that ranges from approximately 1-3 hectares in size (2.5-7.5 acres). The territory is used for feeding, mating and nesting. Other grassland species, such as Horned Larks and Grasshopper Sparrows, are tolerated within the territory with the exception of their near look alike, the Western Meadowlark, in areas where they co-occur (Jaster *et al.* 2012).

Age at First Reproduction: The first full year following fledging (Jaster *et al.* 2012).

Nesting Dates: April through June; nest building begins at least 7 or more days after they arrive on the breeding grounds (Jaster *et al.* 2012); in Minnesota spring migration occurs from early March through early May with a peak in early April (Janssen 1987).

Clutch Size: Clutch size varies from 2 to 7 eggs; earlier clutches are larger than later ones and clutch size is not significantly different between monogamously and polygynously mated females (Jaster *et al.* 2012).

Longevity of Adults: Captive birds lived 3 to 5 years (*Jaster et al 2012*).

Food: During the breeding season, insects comprise approximately 74% of the diet; vegetable matter comprises the remaining 26%. Weed seeds and waste grain are the primary food items during the winter (*Jaster et al. 2012*).

Habitat Requirements and Limiting Factors related to Habitat

Habitat Categorization: Grassland

Limiting Factors during the Breeding Season

From the Upper Mississippi Valley/Great Lakes Landbird Conservation Plan species account (Potter et al. 2007):

- Loss and degradation of suitable habitat due to intensive agriculture appears to limit the species.
- Early mowing and haying of fields can kill young and adults on nests.

Area Sensitivity: Both the occurrence and density of Eastern Meadowlarks respond to the size of the habitat available (*Ribic et al. 2009*).

General Habitat Descriptions

From Birds of North America Species Account (Jaster et al. 2012):

Eastern Meadowlarks inhabit native grasslands, pastures and savannas; they are also found in hay and alfalfa fields, weedy borders of croplands, roadsides, orchards, golf courses, airports, shrubby overgrown fields, or other open areas; tall-grass prairie (western edge of range) and desert grassland. Eastern Meadowlarks show preference for habitats with good grass and litter cover. In areas of sympatry with Western Meadowlarks in the north-central and Great Plains states, Eastern Meadowlarks usually select more poorly drained grasslands of lowlands.

From Effects of Management Practices on Grassland Birds: Eastern Meadowlark (Hull 2000):

- Eastern Meadowlarks prefer moderately tall grasslands with abundant litter cover, a high proportion of grass, moderate to high forb density, and low coverage of woody vegetation.
- They use grasslands of various types such as tallgrass prairie, planted cover (i.e. CRP), etc.
- In Wisconsin and Minnesota, Faanes (1981) found Eastern Meadowlarks in hayfields, oak savannas, overgrazed pastures, oldfields, and shrub carr wetlands.
- Eastern Meadowlarks occasionally breed in agricultural areas such as rowcrop fields, small-grain fields, grassed waterways, farmstead shelterbelts and herbaceous fencerows.
- Where populations of Eastern and Western meadowlarks are sympatric in the Great Plains, Eastern Meadowlarks are found in wet lowland areas, such as valleys and river bottoms, whereas Western Meadowlarks are found in dry uplands.
- The Habitat Suitability Index for Eastern Meadowlarks indicated that optimal habitat contained dense grasses of moderate height (12.5-35cm), low shrub cover (<5%; >35% was too dense), low forb cover, and adequate perches. Optimal total herbaceous (including grass) cover was >90%, whereas <20% was inadequate. Variation in canopy height was preferable.
- Although Eastern Meadowlarks inhabit both native and tame grasslands, no consistent pattern of preference between the two grassland types has been documented.
- Although they tend to avoid areas with heavy woody invasion, they tolerate the presence of some woody vegetation and occasionally sing from woody perches.
- Eastern Meadowlarks have multipurpose territories but prefer large grasslands for breeding.

From Upper Mississippi Valley/Great Lakes Landbird Conservation Plan Species Profile (Potter et al. 2007):

- Most common in native grasslands, pastures, and savannas, but also in hay and alfalfa fields, weedy borders of croplands, roadsides, orchards, golf courses, reclaimed strip mines, airports, shrubby overgrown fields, or other open areas; tall-grass prairie. Species shows preference for grass with a well-developed litter layer and nests in dense vegetation on the ground in a shallow depression.
- Breeding densities can average 80 birds per km² in quality habitat.

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

- Eastern Meadowlarks are a dominant species in pastures, idle short-medium height grasslands, old field, grassland-shrub, dry-mesic prairie and oak savanna.
- They prefer a medium density, high litter layer, with some forb content and few shrubs (5% or less) although they will tolerate up to 30% shrubs.
- Eastern Meadowlark pairs may be attracted to open grasslands as small as 20 acres (8 ha), although a larger acreage is needed to sustain a viable population.
- In Wisconsin, Eastern Meadowlarks usually prefer moister grasslands than Western Meadowlarks.
- Eastern Meadowlarks generally nest in fairly dense vegetation.
- Pastures with light grazing, hayfields with delayed mowing, and managed idle/Conservation Reserve Program (CRP) fields with the appropriate vegetation structure are important for maintaining the Eastern Meadowlark population in Wisconsin.

From Birding by Hindsight (Eckert 2006):

- In Minnesota counties where both meadowlarks occur, breeding habitat is a good clue as to which species is present. Fields favored by Easterns usually consist of longer and sometimes wetter grasses, are often in river valleys, tend to be relatively small, and are fragmented more by shrubs and trees.

Threats

- The loss of grasslands currently protected under the Conservation Reserve Program (CRP) may be the single biggest threat to the Eastern Meadowlark. In Minnesota alone, over 400,000 acres have been lost since 2007. The annual payments that farmers receive for enrolling their land in CRP can no longer compete with rising agricultural commodity prices (McDonald 2013).

From Wisconsin Bird Conservation Initiative Species Account (Kretinger et al. 2013):

- Grasslands used by meadowlarks are vulnerable to conversion to row crops and development as well as to succession to shrubs and trees if not properly managed.
- Many native prairies are too small and isolated to maintain Meadowlark populations on their own.
- With so little habitat left intact, habitat availability will be dependent upon the intensity of agricultural practices and amount of land enrolled into CRP. The more intensive the agriculture the less available habitat there will be for Eastern Meadowlarks.

From the Upper Mississippi Valley/Great Lakes Landbird Conservation Plan species account (Potter et al. 2007):

- Early mowing and haying of fields can kill young and adults on nests.

From Birds of North America Species Profile (Jaster et al. 2012):

- Meadowlarks are extremely sensitive to the presence of humans in their breeding territory. A female flushed from her nest during incubation invariably aborts.
- Agricultural practices affect breeding populations by degrading suitable habitat, grazing and trampling by livestock, and mortality from early mowing and use of pesticides.

- Surface tillage for spring weed-control destroys all nests and flightless young and kills or injures many incubating adults.

Best Management Practices

From Effects of Management Practices on Grassland Birds: Eastern Meadowlark (Hull 2000):

- Keys to management are providing large areas of contiguous grassland of intermediate height with significant grass cover and moderate forb density.
- Specific recommendations for Eastern Meadowlarks:
 1. Promote greater forb density and diversity in managed grasslands to improve overall habitat quality and provide food sources such as insects. This may be accomplished by allowing natural succession to proceed or by interseeding forb species in grassland plantings.
 2. Limit the encroachment of woody vegetation. Remove woody vegetation within and along the periphery of grassland fragments to discourage predators that may use woody vegetation as travel corridors and to enlarge the amount of interior grassland.
 3. Maintain a complex of burned and unburned habitats to provide a variety of grassland habitat types. Conduct prescribed burns in late spring on warm-season grasses to eliminate or reduce competition by cool-season grasses and weeds.
 4. Burn prairie patches >80 ha on a rotation schedule, with 20-30% of area treated annually. Small, isolated prairie patches should not have more than 50-60% of the total area burned at a time. Burning is preferred to grazing because vegetation recovers more quickly after burning than after haying. Discourage grazing on burned grasslands to allow regrowth of herbaceous vegetation. Work to create a mosaic of burned, unburned, and grazed areas.
 5. Burn tallgrass prairie every 3-5 years and mow only at intervals of ≥ 3 years.
 6. Use burning as an alternative to mowing CRP fields to periodically invigorate vegetation. Conduct controlled burns on CRP fields every 3-5 years to reduce vegetation that is too dense.
 7. Provide periodic disturbances such as haying or grazing to increase floristic and structural diversity of seeded-native CRP. Optimal mowing may be every 3-5 years in late summer, involving some kind of raking to reduce the litter layer.
 8. Allow moderate grazing where the average height of currently grazed grassland vegetation is 20.3-30.4 cm to enhance both avian species and plant height diversity. To maintain plant vigor, do not graze warm-season grasses to <25 cm tall during the growing season in tallgrass prairie.
 9. Grazing management decisions that attempt to benefit Eastern Meadowlark populations also must consider soil-type/grazing interactions.

From Birds of North American Species Profile (Jaster et al. 2012):

- Mowing may enhance habitat quality but is best delayed until August to avoid destruction of nests and young and ideally should be done only every 3-5 years.
- Severe grazing (grass height <10cm) discourages nesting and foraging.
- Native grasslands are less attractive after fire, probably owing to shrub mortality.

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

- Grassland restoration and management for Eastern Meadowlarks should seek to create large patches of habitat with a variety of successional stages and types.
- It is best to delay mowing until mid to late July to avoid nest destruction.
- Fields left idle, like CRP fields, are good substitutes for native prairie. However, managers should periodically disturb these fields (3-5 years) to limit woody encroachment and increase forb diversity.
- Moderate grazing levels are compatible with this and other grassland bird species.

From North Carolina Species Profile (Poston, Web access 2010):

- Large, open areas with vegetation height of 10-30 cm are ideal for nesting.
- Refrain from mowing suitable habitat between April and August, as mowing during these months will cause females to abandon their nests and will destroy nests, eggs, and nestlings.
- Provide habitat patches that are mown every 3-5 years or that are not grazed by cattle for a season or two as this enhances vegetation structure for the birds' nesting.
- Provide large contiguous management areas (50 acres or more is ideal), rather than several smaller fields, as predation by mammals and snakes, and parasitism by Brown-headed Cowbirds, are both lower in large fields than in small fields.
- When possible, remove treelines that separate otherwise suitable habitat, as this will increase the effective size of the habitat and enhance suitability and attractiveness of a site for meadowlarks.
- Within pastures, rotate grazing as this will maintain diversity of the height and density of cover vegetation. Eastern Meadowlarks are tolerant of grazing as long as vegetation remains > 10 cm tall.
- Provide areas with a mixture of plant species most similar to a native prairie habitat.

From Partners in Flight Physiographic Region 16 (BCR23) Plan; recommendations for Grassland Birds including the Eastern Meadowlark (Knutson et al. 2001):

- To clarify management unit recommendations for grassland birds, Partners in Flight developed the Grassland Bird Conservation Area (GBCA) Model.
- The Partners in Flight GBCA model describes a theoretical landscape where grassland birds can be supported in high abundances and with adequate reproductive success (*Sample and Mossman 1997*).
- The model calls for a 4,000 ha (10,000 acre or 16 square mile) management unit at the center of which is an 800 ha (2,000 acre, about 3 square mile) block of grassland referred to as the "core."
- Where Greater Prairie-Chickens are a focal species, the core should be centered upon one or more leks and managed in tracts >65 ha (160 acres). Rotational burning at 3-5 year intervals and light grazing are acceptable management practices, as long as the grassland structure remains adequate to attract and support the priority species.
- The 3,200 ha (8,000 acres) matrix surrounding the core contains >800 ha (2,000 acres) of grassland habitat, resulting in a conservation unit with >40% grassland. Minimum area requirements of high priority passerines should be met if 50% of the grassland tracts in the matrix are >40 ha (100 acres). The presence of woody vegetation is considered hostile to grassland bird density and reproductive success and should be <1% of the core or <5% of the matrix.
- It is also important that the grassland habitats in the GBCAs are managed on a rotational basis so that an array of successional stages is available across the landscape at any given time.
- Restore > 10 Grassland Bird Conservation Areas within the entire Prairie Hardwood Transition Region of North America.
- More details can be found in Knutson et al. (2001).

From PIF Physiographic Region 40 (BCR11) Plan: recommendations for Grassland Birds (Fitzgerald et al. 1998):

- In those areas within the Northern Tallgrass Prairie region where Bird Conservation Areas (see below under Conservation Recommendations) are a reasonable conservation tool, we recommend a minimum of two BCAs per approximately 40,000 hectares (100,000 acre) landscape unit. This may allow birds to move between sites when stochastic factors and/or successional changes render a particular site unsuitable for a particular species in the suite.
- It is important that grassland habitats in the BCAs are managed on a rotational basis so that an array of successional stages is available at any given time, requiring communication and coordination among managers. BCA core areas should be centered on leks of Greater Prairie-Chickens whenever possible, to provide sufficient nesting and brood cover during the breeding season.

From PIF Physiographic Region 20 (BCR12) Plan for grassland/shrubland species; included below are those that address Meadowlark needs (Matteson et al. 2009):

- Focus management and protection priorities on grasslands that are large, diverse, support rare species, contain minimal woody cover, and are embedded in landscapes with large amounts of open grassland or barrens (McCoy 2000, Ribic and Sample 2001, Bakker et al. 2002). Aim to manage landscapes of grasslands, barrens or sedge meadows at a scale of more than 4,050 hectares.
- Evaluate the feasibility of creating Grassland Bird Conservation Areas (GBCAs) in suitable landscapes (see Knutson et al. 2001 and Fitzgerald et al. 1998).
- Identify areas appropriate for grassland-shrub management that will not conflict with other grassland priorities. Build public-private partnerships to conserve and restore grassland-shrub habitats in designated areas. Landscape-scale projects should be able to accommodate areas of shrub-grassland within a grassland matrix.
- Use prescribed fire with cutting and/or herbicides and grazing to prevent excessive woody encroachment. Schedule burns outside the breeding season for birds (Sample and Mossman 1997).
- Before using prescribed burning for grassland management, determine habitat objectives:
 1. If managing for grassland birds preferring no residual vegetation or woody cover requirement, conduct short (1-2 years) burn rotations.
 2. For large sites, consider only burning portions of the property in a given year to diversify both the vegetation structure and bird community.
- Identify excess or idled farm fields, fields that may not be critical for agricultural production, and fields that are usually too wet for production to form the base of a grassland conservation effort on individual farms. Preferably these areas are adjacent to one another to create a single, large refuge area (Undersander et al. 2000, Ochterski 2006).
- Consider the rotational grazing of pastures in place of heavy, continuous grazing. Set aside one third of a pasture area as an ungrazed and unmowed refuge from May 15 - July 1 and rotationally graze the remaining grassland area. After July 1, the refuge area can be mowed and incorporated into the rotational grazing schedule (Temple et al. 1999).
- Mow habitat parcels managed for grassland bird conservation after August 10. Where management goals include both grassland birds and forage production, encourage mowing after July 15
- Mow hayfields from the field center outward to provide cover that allows fledgling birds to escape to the edge of the field. Flushing bars should be mounted on harvesting equipment to minimize bird mortality during mowing operations (NRCS 1999, Ochterski 2006).
- Locate idle nesting cover adjacent to hayfields to provide alternate habitat for species that renest after mowing-induced failure of first nest attempts (Sample and Mossman 1997, NRCS 1999).

Gaps in Knowledge

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

- Continued population monitoring is needed to continue documentation of population status.
- Due to their nearly identical appearance, the extent of hybridization with Western Meadowlark is unknown.
- Data is also needed on possible effects of cowbird parasitism.
- Continuation of productivity studies are important to determine and better model the future population trends and better identify habitats that are suitable for Eastern Meadowlarks.

From Upper Mississippi Valley/Great Lakes Landbird Conservation Plan Species Profile (Potter et al 2007):

- Effective monitoring to measure population densities is important as BBS generated densities have not been tested; evaluate/determine most efficient habitat actions to increase populations.

MINNESOTA CONSERVATION PLAN

Conservation Goal

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

Background: The Partners in Flight (*Rich et al. 2004*) population objective for the Eastern Meadowlark is to increase populations by 100%. In 2004 the Partners in Flight (PIF) population estimate for Minnesota was 39,000 individuals and the PIF target was 78,000. However, in 2012, Partners in Flight updated population estimates for all of the landbirds using the most recent data from the Federal Breeding Bird Survey (BBS) and a revised and improved model (*Partners in Flight Science Committee 2013*). Changes to the model, in particular a decrease in the detection distance, resulted in a near doubling in the national and state population estimate. In 2012, the population estimate for Minnesota was 70,000 individuals. The population objectives were not revised in 2012 and this plan assumes that it remains to increase the population by 100% or to a minimum of 140,000 individuals. Given the meadowlark's continued population decline, and the recent loss of Conservation Reserve Program (CRP) acres in the state, this conservation goal is well-justified. The PIF national conservation goal (*Rich et al. 2004*) also has been incorporated into the Upper Mississippi Valley/Great Lakes Joint Venture Landbird Conservation Plan (*Potter et al. 2007*).

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: Increasing Minnesota's Eastern Meadowlark population from its current estimated population of 70,000 individuals to 140,000 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 Eastern Meadowlark population, it is important to delineate grassland regions in the state which support the highest abundance of the species.

Action: Confirm the breeding status of Eastern Meadowlarks on the 10 Important Bird Areas where they have been documented nesting in the past (Table 1). Assess the approximate number of breeding pairs on each IBA with road counts and/or point counts.

Action: Confirm the status of Eastern Meadowlarks on the 13 Minnesota IBAs listed in Table 5 where they have been reported during the summer months. Again, assess the approximate number of breeding pairs on each IBA with road counts and/or point counts.

Background: In addition to the 10 IBAs where Eastern Meadowlarks have been confirmed nesting; they also have been reported during the summer from 38 additional IBAs. This action places a priority on assessing their status on those large IBAs with grassland habitat in the Prairie Hardwood Transition Region, the region of the state where Eastern Meadowlarks appear to be most abundant. Although the birds do nest further east and west they appear to be less abundant in these regions.

Table 5. Minnesota IBAs in the Prairie Hardwood Transition Region where Eastern Meadowlark breeding is likely and needs further assessment

Arden Hills-Rice Creek North Open Space	Crane Meadows	St. Croix Lake
Avon Hills	Lake Maria State Park	Swan Lake
Blufflands-Root River	Lower Minnesota River Valley	Vermillion Bottoms- Lower Cannon River
Camp Ripley-Pillsbury-Lake Alexander	Mille Lacs	
Carlos Avery	St. Croix River Bluffs	

Action: Assess whether the Grassland Bird Conservation Areas (GBCAs) delineated by the U.S. Fish and Wildlife Service’s Habitat and Populations Evaluation Team (HAPET) office in Fergus Falls and located within central Minnesota, overlap with any additional Important Bird Areas that also should be evaluated.

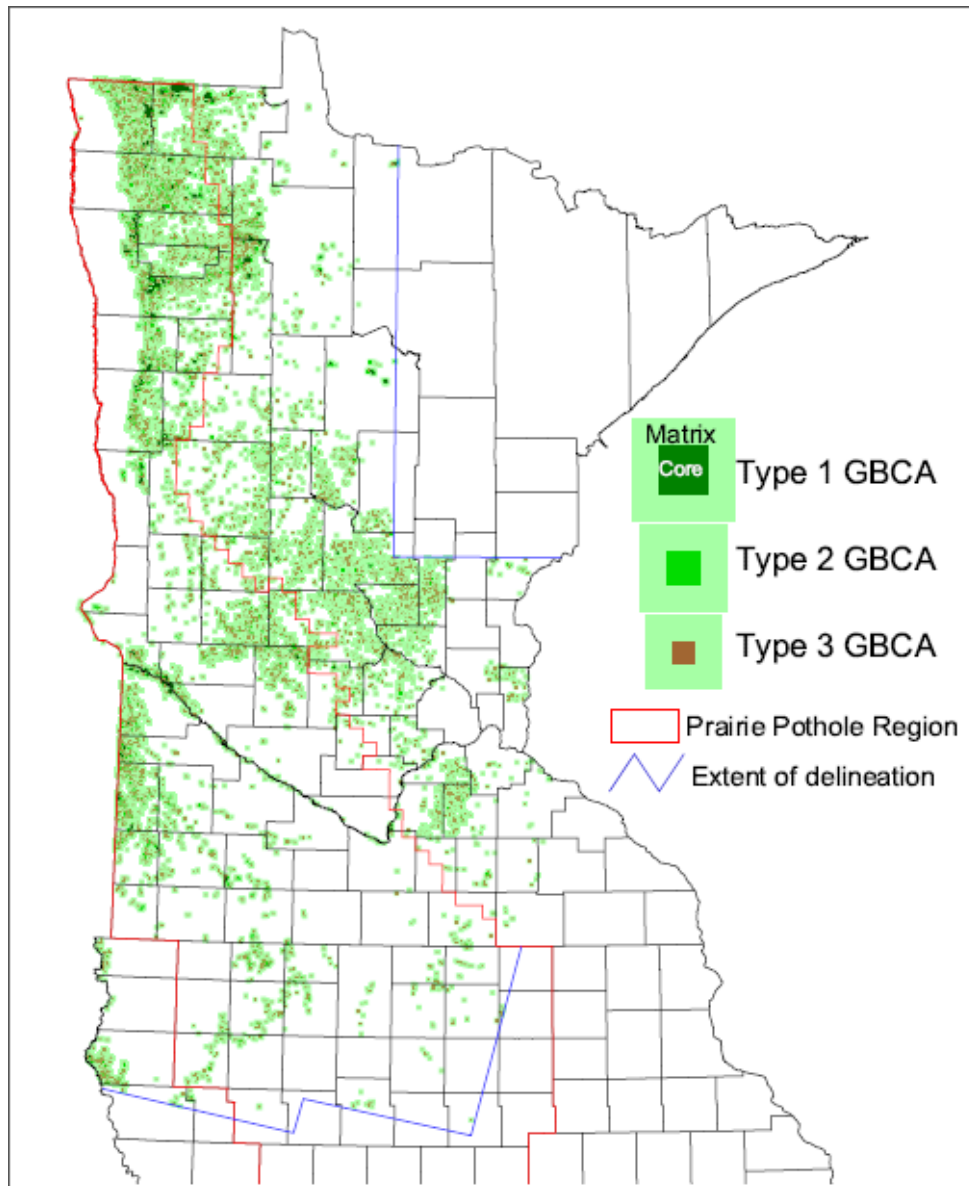
Background: In order to begin to achieve the conservation goal established in this conservation blueprint for Eastern Meadowlarks, there needs to be an assessment of whether the areas that are predicted to support high numbers of breeding birds do indeed do so. One way to approach this task is to assess the birds’ presence and abundance on those IBAs that include at least Type 1 Grassland Bird Conservation Areas (GBCAs) and potentially Type 2 GBCAs in the central region of the state where Eastern Meadowlarks are known to occur.

The HAPET office has taken the GBCA concept originally developed by Sample and Mossman (1997) and later adopted by Partners in Flight (*Knutson et al. 2001, Fitzgerald et al. 1998 and Matteson et al. 2009*) and further refined it for application in the Prairie Pothole region. The office delineated three tiers of Grassland Bird Conservation Areas (GBCAs). The largest GBCA was designed to address the needs of the most area-sensitive species. All three GBCAs include a grassland core surrounding a one-mile wide matrix of wetland and grassland habitats. In Type One, the core is a minimum of 640 acres of grassland at least one mile wide. Grasslands should comprise at least 40% of the surrounding matrix and core. Further details can be found at:

<http://www.fws.gov/midwest/hapet/Documents/FactSheetGBCAs1.pdf>.

A map of the GBCAs delineated by the HAPET office is shown in Figure 5.

Figure 5. Predicted Grassland Bird Conservation Areas in Minnesota and northern Iowa



Action: Assess whether any of Minnesota's Breeding Bird Atlas blocks that supported Probable or Confirmed breeding Eastern Meadowlarks overlap with any of the Grassland Bird Conservation Areas delineated by HAPET in central Minnesota and further evaluate their importance to Minnesota's -- Eastern Meadowlark population.

Background: Minnesota's Breeding Bird Atlas, conducted from 2009-2013, is a wealth of recent information on the distribution and abundance of Eastern Meadowlarks. Blocks where Confirmed or Probable evidence codes were recorded are either known or suspected to support breeding populations. These sites should be further evaluated to determine their proximity to existing Important Bird Areas or to Grassland Bird Conservation Areas that might require further field evaluation.

Monitoring Needs

- Continue monitoring the statewide population of Eastern Meadowlarks.

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 Eastern Meadowlarks.

Background: Despite some of the potential challenges of field identification the Federal Breeding Bird Survey is a reasonable tool for monitoring the species' statewide population.

Research Needs

- Improve our understanding of habitat qualities and management actions that lead to reproductively successful and increasing (or sustainable) populations.

Action: Encourage the initiation of research to improve our understanding of the reproductive success of Eastern Meadowlarks in different grassland habitats and management regimes in Minnesota.

Habitat Protection Needs

- Continue to emphasize and support grassland habitat protection efforts across western and central Minnesota.

Action: Support the native prairie and grassland habitat protection goals established by the Upper Mississippi Valley/Great Lakes Joint Venture and the Minnesota Prairie Landscape Conservation Plan and work with conservation partners to meet their combined goal of protecting nearly 480,000 acres (Table 6).

Background: Habitat protection goals for the Eastern Meadowlark displayed in Table 6 are drawn from two documents. The first document is the Landbird Habitat Conservation Strategy for the Upper Mississippi Valley/Great Lakes Joint Venture (*Potter et al. 2007*). The Joint Venture established habitat conservation goals for guilds of landbirds that utilize seven different habitats, including deciduous forest, forested wetland and grassland. The Eastern Meadowlark was selected by the Joint Venture as a focal species for grassland habitats. Habitat goals are established for each Bird Conservation Region in each state.

The second document used to establish the protection goal is the Minnesota Prairie Landscape Conservation Plan (*Minnesota Prairie Plan Working Group 2010*). A broad coalition of government and conservation organizations worked for several years to outline a targeted conservation strategy to protect Minnesota's native prairies and grasslands. The plan covers a broad area of central and western Minnesota and roughly corresponds to the boundaries of the Prairie Pothole Joint Venture region in Minnesota (Figure 6). In lieu of not having any habitat goals for the Prairie Potholes Joint Venture region, the habitat goals established by this document are an excellent surrogate.

Although most of the area covered by the Prairie Landscape Conservation Plan is prime habitat for Western Meadowlarks, the eastern half is well within the Eastern Meadowlark's range. In addition, records by both the Minnesota Biological Survey and the Breeding Bird Atlas document the consistent presence of birds during the nesting season in southwestern Minnesota (Figure 1). As a result, protection and restoration work directed at native prairie and grasslands within the area delineated by the Prairie Plan will benefit a portion of Minnesota's Eastern Meadowlark population.

Table 6. Prairie and Grassland Protection Goals for protecting Eastern Meadowlarks in Minnesota

Minnesota Region or Joint Venture	Habitat	Bird Conservation Region	Minnesota Protection Goal
Upper Mississippi Valley/Great Lakes ¹	Grassland	12	143,260 acres
		22	37,050 acres
		23	77,311 acres
Subtotal			257,621 acres
Prairie Potholes	Native Prairie	Core Areas ³	73,108 acres
		Corridors	8,089 acres
		Agricultural Matrix	23,756 acres
	Grasslands ²	Core Areas	88,185 acres
		Corridors	25,967 acres
Subtotal			219,105 acres
Total			476,726 acres

¹ In Minnesota the Upper Mississippi Valley/Great Lakes Joint Venture Region encompasses Audubon Minnesota's Boreal Hardwood Transition Region and the Prairie Hardwood Transition Region and portions of Partners in Flight Bird Conservation Regions 12 (Boreal Hardwood Transition), 22 (Eastern Tallgrass Prairie) and 23 (Prairie Hardwood Transition).

²There is an additional goal established for grasslands and wetlands within the agricultural matrix surrounding the core areas but the acres for wetlands and grasslands were combined (See Table 7). The totals above are specifically for the identified core areas and corridors between the cores.

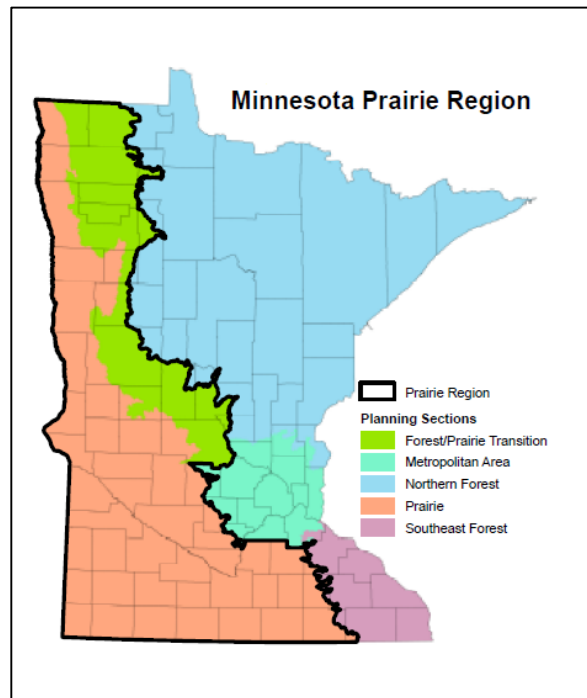
³Delineation of the core areas and corridors is illustrated in Figure 7.

The focus of the Minnesota Prairie Landscape Conservation Plan was to delineate landscape areas that are most critical for grassland conservation. The plan delineates two areas for native prairie, grassland and wetland protection and restoration:

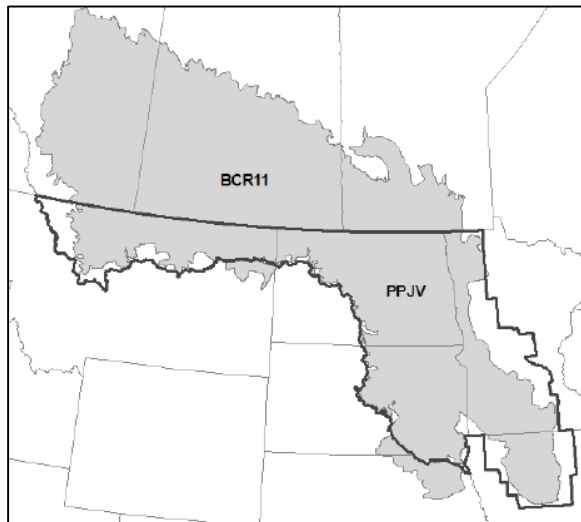
- **Core areas** that are “large landscapes (5,000 to 300,000 acres) that retain some features of a functioning prairie landscape and include 71% of Minnesota’s remaining native prairie”; and
- **Corridors** that are “linear stretches of habitat six miles wide that connect the core areas to each other.”

Large habitat complexes (nine square miles) are identified within each corridor and all the land outside of the core areas and corridors is referred to as the agricultural matrix. Figure 7 illustrates the core areas, corridors and larger agricultural matrix.

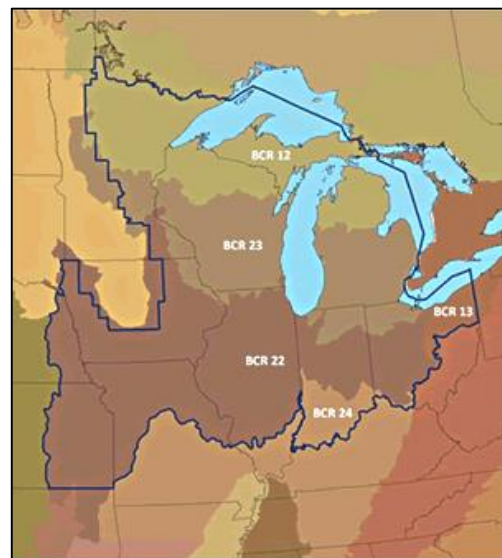
Figure 6. Comparison of the Joint Venture Region Boundaries and Minnesota's Prairie Landscape Region



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

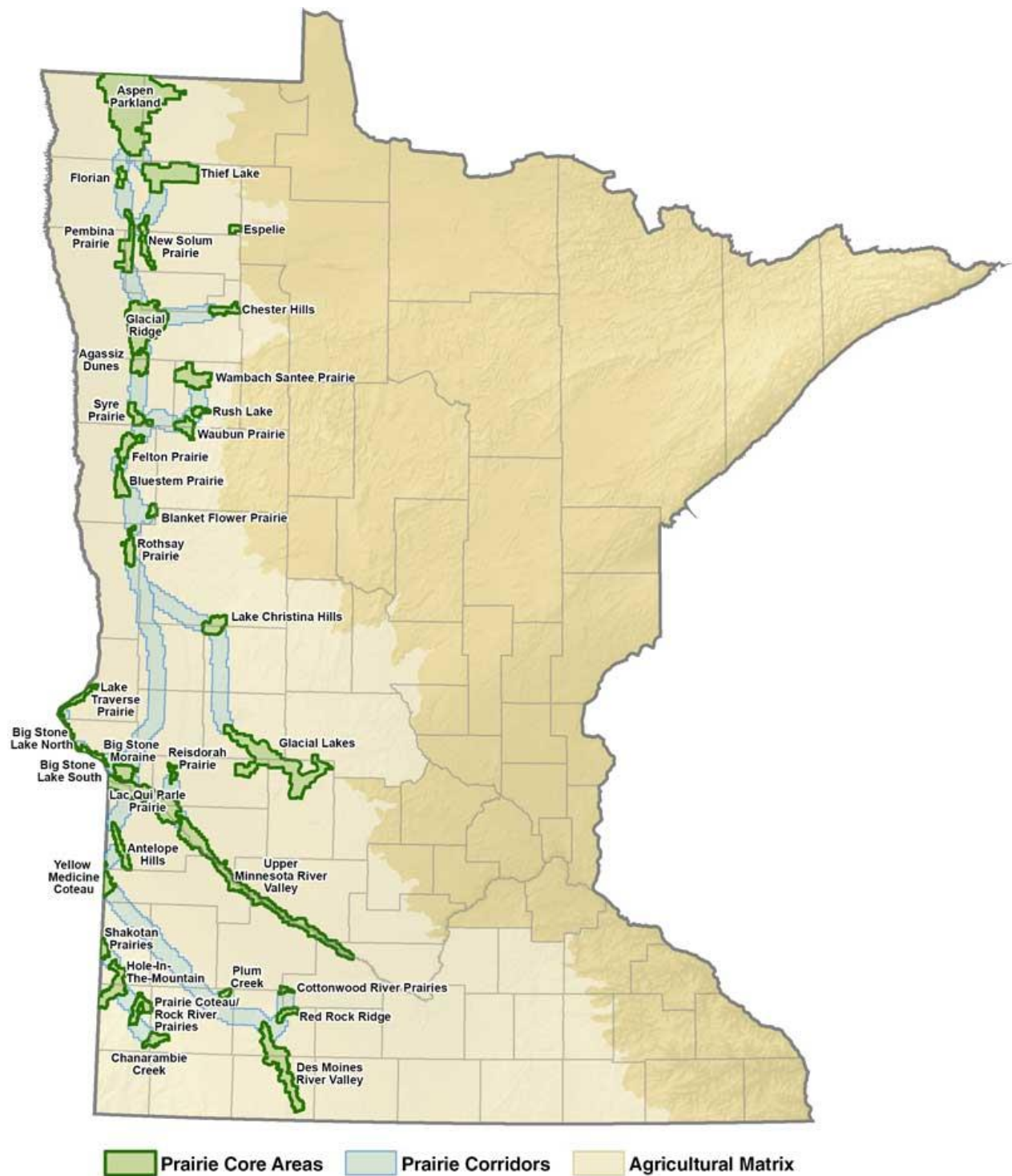


Boundary of the Prairie Potholes Joint Venture Region (dark line) with Bird Conservation Region 11



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



Minnesota's Prairie Landscape Conservation Plan also establishes protection goals for the core areas, corridors and agricultural matrix and specifies what portion of each goal should be permanently protected versus voluntarily protected (Table 7). Ideally, Minnesota's conservation community will achieve all the goals for each area, thereby benefitting Eastern Meadowlarks and many other declining grassland and wetland species. For the purposes of this Conservation Plan, however, we have focused only on the protection goals established for permanently protected (i.e. protected through fee acquisition or permanent conservation easements) native prairies in the core areas, corridors and agricultural matrix and for permanently protected grasslands in the core areas and corridors shown in Table 7 (highlighted in green). The acres that are to be permanently protected in the matrix and voluntarily protected in the core areas, corridors and matrix, were not reported separately for grasslands and wetlands but only as a combined total and are, therefore, not included.

Table 7. Complete Prairie and Grassland Protection Goals from Minnesota's Prairie Landscape Conservation Plan

Conservation Action	Prairie Landscape Conservation Areas	Specific Conservation Action	Acreage Goals by Habitat ¹		
			Native Prairie	Non-native Grasslands	Grasslands & Wetlands
Protection	Core Areas	Acquisition/Easements	73,108 acres	88,185 acres	
		Voluntary management or conservation contracts			149,022 acres
	Corridor Areas (complexes & general corridors)	Acquisition/Easements	8,089 acres	25,967 acres	73,900 acres
		Voluntary management or conservation contracts			80,583 acres
	Matrix Landscape	Acquisition/Easements	23,756 acres		523,564 acres
		Voluntary management or conservation contracts			1,221,650 acres
Protection Total			104,953 acres	114,152 acres	2,048,719 acres

¹Some subtotals for conservation actions in the Prairie Plan do not reflect the totals reported in the plan; this table uses the totals; also the plan incorrectly reports the total acres for native prairie protection as 104, 594 acres

Habitat Restoration and Management Needs

- There is a need to continue to emphasize and support grassland habitat restoration efforts across western and central Minnesota.

Action: Support the native prairie and grassland habitat restoration goals established by the Upper Mississippi Valley/Great Lakes Joint Venture and the Minnesota Prairie Landscape Conservation Plan and work with conservation partners to meet their combined goal of restoring nearly 400,000 acres (Table 8).

Background: The grassland 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 grasslands 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 8. Grassland Restoration Goals for protecting Eastern Meadowlarks in Minnesota

Minnesota Region or Joint Venture	Habitat	Bird Conservation Region	Minnesota Restoration Goal¹
Upper Mississippi Valley/Great Lakes	Grasslands	12	143,260 acres
		22	37,050 acres
		23	77,311 acres
Subtotal			257,621 acres
Prairie Potholes	Grasslands	Core Areas	97,778 acres
		Corridors	37,413 acres
Subtotal			135,191 acres
Total			392,812 acres

¹There are additional goals established for restoring “grasslands and wetlands” within the corridors and agricultural matrix surrounding the core areas for the Minnesota Prairie Region but the acres for wetlands and grasslands were combined and are not included in the table.

- Ensure that sites that support breeding populations of Eastern Meadowlarks are actively managed; employing the best management practices summarized earlier in this conservation blueprint.

Action: Audubon Minnesota should coordinate with the land owners of the primary Important Bird Areas that support Eastern Meadowlark populations to support the implementation of management practices that enhance and/or sustain breeding populations.

Action: Where it is appropriate, consider delineating Grassland Bird Conservation Areas within Important Bird Areas that support significant Eastern Meadowlark populations in order to further the management of grasslands to support viable sparrow populations, as well as other priority grassland birds.

- Monitor the amount of native prairie and grassland habitat that is protected and restored and assess if it is sufficient to provide for a sustainable population of Eastern Meadowlarks 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 grassland habitat for the Minnesota portion of the Upper Mississippi River Valley/Great Lakes Joint Venture region and for the Minnesota Prairie Landscape Conservation Plan.

Action: Work with population modelers in the Upper Mississippi Valley/Great Lakes Joint Venture science team and the U.S. Fish and Wildlife Service’s HAPET office in Fergus Falls to determine whether the actions of the UMVGL Joint Venture and Minnesota Prairie Landscape Conservation Team are supporting a sustainable population of Eastern Meadowlarks.

Specific Actions for Audubon Minnesota:

- Work with the Minnesota Department of Natural Resources to ensure that:
 1. Eastern Meadowlark management needs are considered in grassland protection and restoration efforts
 2. Department staff continues their leadership and coordination of efforts among conservation partners to implement the Minnesota Prairie Landscape Conservation Plan goals for grassland protection and restoration.
 3. Encourage Department staff to invest in field studies to assess the reproductive success of Eastern Meadowlarks and assess the habitat factors most critical to increasing success.
 4. Eastern Meadowlarks receive due consideration when managing state lands in the Prairie Hardwood Transition region.
- Work with the Minnesota Ornithologist Union to ensure that Minnesota BBA routes are adequately covered each year in Minnesota.
- Work with local Audubon Chapters and former BBA citizen science volunteers to assess and monitor Eastern Meadowlark populations on Important Bird Areas where appropriate.

Additional actions for implementing this conservation plan are detailed in Table 9.

Table 9. Eastern Meadowlark Minnesota Conservation Blueprint Action Summary

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

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.

Actions Needed for Conservation	Priority	Projected Timeline	Responsible Entity	Potential Conservation Partners
Inventory and Assessment				
<ul style="list-style-type: none"> Confirm the breeding status of Eastern Meadowlarks on the ten Important Bird Areas where they have been documented nesting in the past. Assess the approximate number of breeding pairs on each IBA with road counts and/or point counts. 	#1	2016	Audubon Minnesota	Minnesota DNR, USFWS
<ul style="list-style-type: none"> Confirm the status of Eastern Meadowlarks on 13 Minnesota IBAs where they have been reported during the summer months. Again, assess the approximate number of breeding pairs on each IBA with road counts and/or point counts. 	#2	2016	Audubon Minnesota	Minnesota DNR, USFWS
<ul style="list-style-type: none"> Assess whether the Grassland Bird Conservation Areas (GBCAs) delineated by the U.S. Fish and Wildlife Service's Habitat and Populations Evaluation Team (HAPET) office in Fergus Falls and located within central Minnesota, overlap with any additional Important Bird Areas that also should be evaluated. 	#5	2016	Audubon Minnesota	Minnesota DNR, USFWS
<ul style="list-style-type: none"> Assess whether any of Minnesota's Breeding Bird Atlas blocks that supported Probable or Confirmed breeding Eastern Meadowlarks overlap with any of the Grassland Bird Conservation Areas delineated by HAPET in central Minnesota and further evaluate their importance to Minnesota's Eastern Meadowlark population. 	#6	2017	Audubon Minnesota	Minnesota DNR, USFWS
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 Eastern Meadowlarks. 	#12	2015	Minnesota Ornithologists Union	Audubon Minnesota, Minnesota DNR
Research				
<ul style="list-style-type: none"> Encourage the initiation of research to improve our understanding of the reproductive success of Eastern Meadowlarks in different grassland habitats and management regimes in Minnesota. 	#8	Ongoing	Minnesota Audubon	Minnesota DNR, USFWS, University, USGS
<i>Continued on following page</i>				

Actions Needed for Conservation	Priority	Projected Timeline	Responsible Entity	Potential Conservation Partners
Habitat Protection				
<ul style="list-style-type: none"> Support the native prairie and grassland habitat protection goals established by the Upper Mississippi Valley/Great Lakes Joint Venture and the Minnesota Prairie Landscape Conservation Plan and work with conservation partners to meet their combined goal of protecting nearly 480,000 acres. 	#3	Ongoing	Audubon Minnesota	Minnesota DNR, USFWS, BWSR, TNC
Habitat Restoration and Management				
<ul style="list-style-type: none"> Support the native prairie and grassland habitat restoration goals established by the Upper Mississippi Valley/Great Lakes Joint Venture and the Minnesota Prairie Landscape Conservation Plan and work with conservation partners to meet their combined goal of restoring nearly 400,000 acres. 	#4	Ongoing	Audubon Minnesota	Minnesota DNR, USFWS, BWSR, TNC, NRCS
<ul style="list-style-type: none"> Audubon Minnesota should coordinate with the land owners of the primary Important Bird Areas that support Eastern Meadowlark populations to support the implementation of management practices that enhance and/or sustain breeding populations. 	#7	Ongoing	Audubon Minnesota	Minnesota DNR, USFWS, Private Landowners, TNC
<ul style="list-style-type: none"> Where it is appropriate, consider delineating Grassland Bird Conservation Areas within Important Bird Areas that support significant Eastern Meadowlark populations in order to further the management of grasslands to support viable sparrow populations, as well as other priority grassland birds. 	#9	Ongoing	Audubon Minnesota	DNR, USFWS, TNC, Private Landowners, Prairie Landscape Implementation Team
<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 grassland habitat for the Minnesota portion of the Upper Mississippi River Valley/Great Lakes Joint Venture region and for the Minnesota Prairie Landscape Conservation Plan 	#10	Ongoing	Prairie Landscape Implementation Team, Upper Mississippi Valley/Great Lakes Joint Venture	Audubon Minnesota
<ul style="list-style-type: none"> Work with population modelers in the Upper Mississippi Valley/Great Lakes Joint Venture science team and the U.S. Fish and Wildlife Service's HAPET office in Fergus Falls to determine whether the actions of the UMVGL Joint Venture and Minnesota Prairie Landscape Conservation Team are supporting a sustainable population of Eastern Meadowlarks. 	#11	Ongoing	Upper Mississippi Valley/Great Lakes Joint Venture, USFWS HAPET office	Audubon Minnesota, Prairie Landscape Implementation Team

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