



Credit: Jim Williams

Grasshopper Sparrow Minnesota Conservation Plan

*Audubon Minnesota
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Grasshopper Sparrow Conservation Plan

Ammodramus savannarum

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

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

Executive Summary

Audubon Minnesota has selected the Grasshopper Sparrow as one of 26 Target Conservation Species in the state and one of four species selected to represent Minnesota's Prairie Parkland Region (also known as the Prairie Parkland Ecological Province by Minnesota's Ecological Classification System and part of Bird Conservation Region 11 (i.e. the Prairie Potholes) by Partners in Flight). The other three Target Conservation Species for the region are the Blue-winged Teal, Upland Sandpiper and Black Tern. All four species are classified as Highest Level Priorities by Audubon's *Implementation Blueprint for Minnesota Bird Conservation*. Conservation plans were only prepared for three of the four highest priority Target Conservation Species in the region. Because it is managed as a harvested waterfowl species by the Minnesota Department of Natural Resources and the U.S. Fish and Wildlife Service, a plan was not prepared for the Blue-winged Teal.

The diminutive Grasshopper Sparrow is a denizen of Minnesota's native prairie and grassland habitats. Small and brown, the Grasshopper's breeding songs are high-pitched and wispy and can be difficult to hear in grasslands where winds often confound the ability to hear territorial males. In Minnesota the sparrow is found throughout the Prairie Parklands, Aspen Tallgrass Parklands and the Prairie Hardwood Transition regions, where suitable habitat is present. Although originally dependent on native prairie, the Grasshopper Sparrow has adapted to utilize pastures and hayfields. It tends to prefer drier sites with some patches of bare ground and an absence of shrubby cover. Like other species dependent on grasslands, the recent loss of over 400,000 acres of Conservation Reserve Program (CRP) grasslands since 2007, is a major concern for a species already experiencing dramatic population declines.

Since 1966, Grasshopper Sparrows have declined an average of 7.28% per year in Minnesota, for an overall population loss of 97%. Only one species, the Western Meadowlark (-8.09%), has declined more per year in Minnesota over that same time period. Indeed, in the ten year period from 2002 to 2012, the Grasshopper Sparrow has declined at an even higher rate of 9.21% per year.

The Conservation Plan that follows is divided into two parts. The first provides background on the Grasshopper Sparrow, including its status, distribution, habitat requirements and management needs. The second is a detailed conservation plan that outlines specific management recommendations. The highest priority is to collect additional data on the 14 Audubon Minnesota Important Bird Areas where nesting has been documented and eleven other IBAs that are significant grassland tracts where the bird has been observed in the past. Protecting and restoring grasslands is extremely important and Audubon Minnesota can make the most significant gains by actively working to support implementation of Minnesota's Prairie Landscape Conservation Plan.

Introduction

The Grasshopper Sparrow was selected as a **Target Conservation Species** for Minnesota's *Implementation Blueprint for Bird Conservation* (<http://mn.audubon.org/>). It is one of four Target Conservation Species selected for the Prairie Parkland Region, one of Minnesota's four ecological regions (also known as the Prairie Parkland Ecological Province by Minnesota's Ecological Classification System and as part of Bird Conservation Region 11 (i.e. the Prairie Potholes) by Partners in Flight). The process for selecting target conservation species is described in the *Blueprint's* conservation recommendations for the Prairie Parklands 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 Parklands 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. Wetlands
2. Prairies/Grasslands

The Grasshopper Sparrow was selected to represent prairies/grasslands. A complete list of the other priority birds and conservation targets in the Prairie Parklands Region can be found in the *Implementation Blueprint*. Because one of the region's target conservation species is a harvested waterfowl species that receives considerable management attention by state and federal resource agencies, a comprehensive conservation plan was not prepared (the Blue-winged Teal).

Background

Status

Legal Status: None

Other Status Classifications:

1. National
 - Identified by the National Audubon Society as one of the top 20 common birds in decline (*National Audubon 2007*).
 - Identified by Partners in Flight Tri-National as a Common Bird in Steep Decline (78% of the population has been lost since monitoring began in 1966) (*Berlanga et al. 2010*).
2. Regional
 - U.S. Fish and Wildlife Service Bird of Management Concern in the Midwest Region (*U.S. Fish and Wildlife Service 1995*).
 - U.S. Fish and Wildlife Service Focal Species in the Midwest Region in 2005 (*U.S. Fish and Wildlife Service 2005*) and in Fiscal Years 2012-2016 (*U.S. Fish and Wildlife Service 2011*).
 - U.S. Fish and Wildlife Service Bird of Conservation Concern in Bird Conservation Regions 11 (Prairie Potholes) and 22 (Eastern Tallgrass Prairie) (*U.S. Fish and Wildlife Service 2008*).
 - Identified by the U.S. Fish and Wildlife Service as a Focal Species for the Plains and Prairie Pothole Landscape Conservation Cooperative (*U.S. Fish and Wildlife Service 2009*).

- Identified by Partners in Flight-National as a Stewardship Species; Stewardship Responsibility is in the Prairie Region (*Rich et al. 2004*).
- Partners in Flight Bird Conservation Region 11 (Prairie Potholes): Regional Concern Species; Action is Immediate Management (*Rich et al. 2004*).
- Partners in Flight Bird Conservation Region 22 (Eastern Tallgrass Prairie): Regional Concern Species; Action is Immediate Management (*Rich et al. 2004*).
- Partners in Flight Bird Conservation Region 23 (Prairie Hardwood Transition): Regional Concern Species; Action is Management (*Rich et al. 2004*).

3. Minnesota

- Species in Greatest Conservation Need in Minnesota (*Minnesota DNR 2006*); it is proposed to remain on the list of Species in Greatest Conservation Need in 2013.

Range

Historical Breeding Range: The Grasshopper Sparrow has always been widely distributed across the eastern United States from southern Maine, Vermont and New Hampshire west across southern Quebec and Ontario, the Great Lakes states and northern Great Plains (including the southern tier of the Canadian Prairie Provinces) south to Texas and east to northern Georgia and South Carolina (Figure 1) (*Vickery 1996*).

In Minnesota, the species historically occurred throughout the state. Although it was sparse in occurrence it could even be found in the extreme northern regions where there were extensive open areas (*Roberts 1932*).

Current Breeding Range: The major change in the species North American distribution is the reduction in range in New England where the species now occurs only as remnant populations in Massachusetts and southern Maine, Vermont and New Hampshire. Local, remnant populations remain in much of the heart of the Midwest where the loss of native prairie and agricultural grasslands has been extensive (*Vickery 1996*).

In Minnesota, the species is still widespread although rarely found now in the northeastern and north central regions of the state.

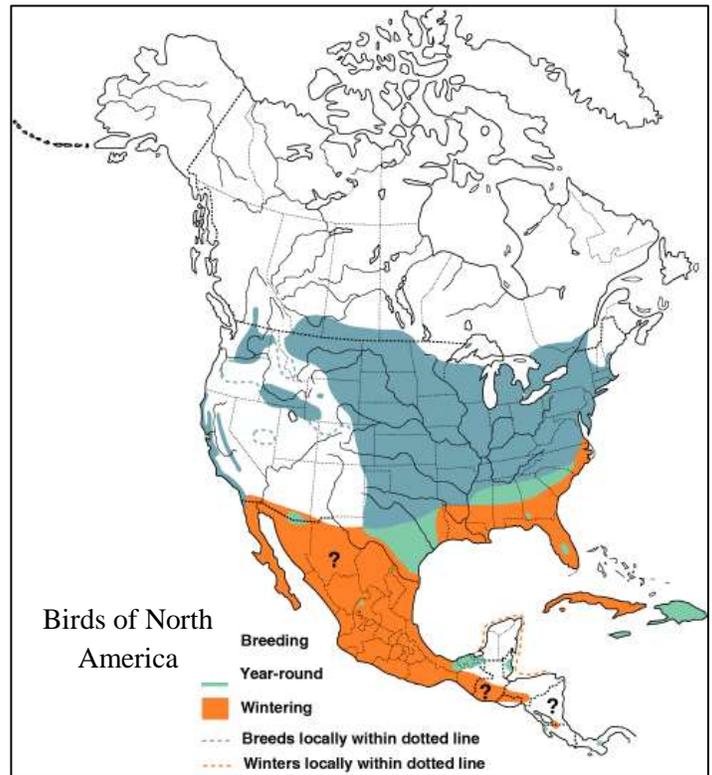
Summary of Presence on Minnesota Important Bird Areas: Grasshopper Sparrows have been documented as present either as a summer resident or migrant on 45 of the currently designated 57 Important Bird Areas (IBAs) in Minnesota. Among the 45, they have been confirmed breeding at 14 IBAs listed in Table 1.

Table 1. Presence of Grasshopper Sparrows on Audubon Minnesota’s Important Bird Areas

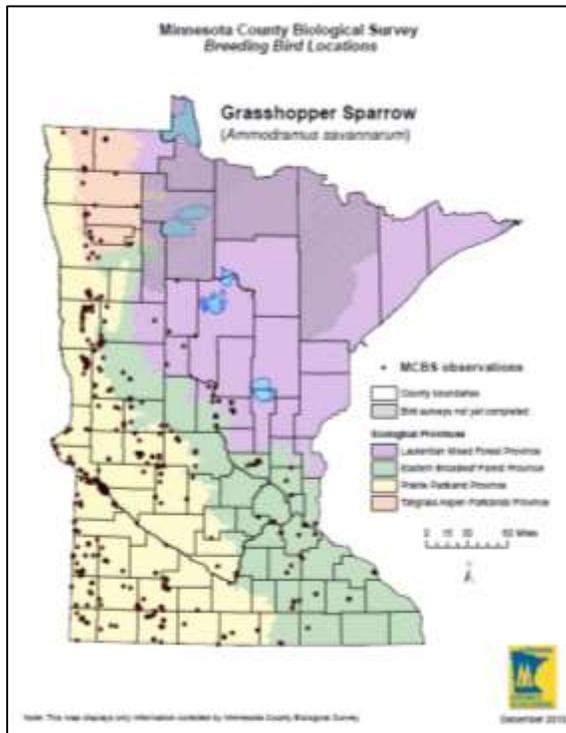
Chippewa Plains	Kettle River-Banning State Park	St. Croix - Greater Wild River
Des Moines River	Kittson Roseau – Aspen Parklands	Thief Lake
Goose Lake Swamp	Lac Qui Parle – Big Stone	Twin Cities Mississippi River
Hamden Slough NWR	Murphy Hanrahan Park	Upper Mississippi River NWR
Heron Lake	Sherburne NWR	

Given the wide distribution of these 14 IBAs, it is likely that the birds are breeding at many of the other IBAs across Minnesota.

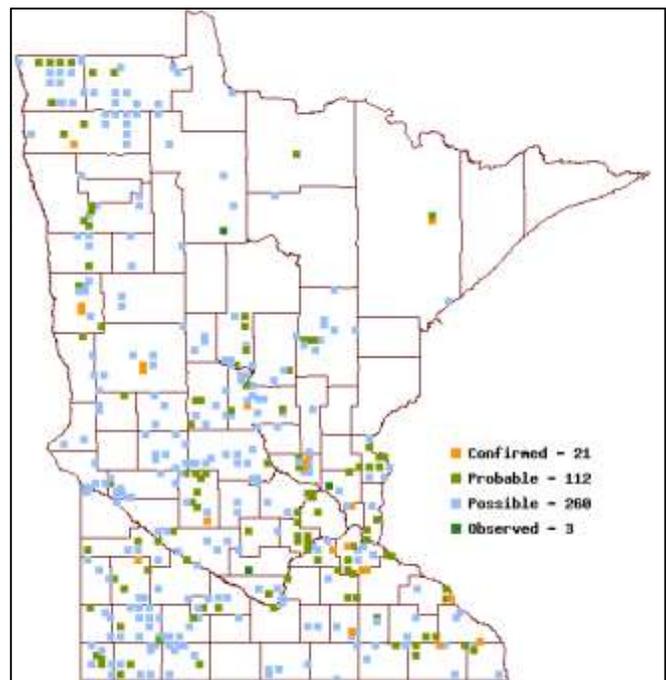
Figure 1. Grasshopper Sparrow Distribution Maps



Birds of North America <http://bna.birds.cornell.edu/bna/>



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



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

Population Numbers

National

- In 2004, the population estimate for the U.S. and Canada was 14,000,000 (15,000,000 globally) (Rich et al. 2004). In 2012, the U.S. and Canada population estimate was 30,400,000 (Partners in Flight Science Committee 2013).

At first glance a doubling of the population in less than 10 years seems incongruous with the species range-wide population 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 Breeding Bird Survey (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 all landbird population estimates 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).

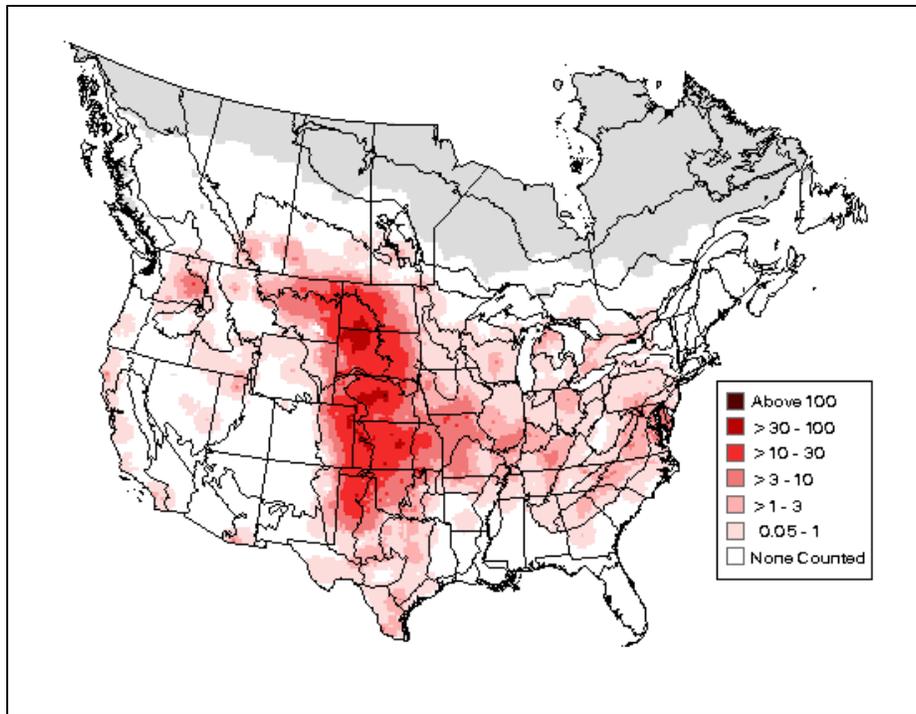
The adjustment factors used in the Grasshopper Sparrow model are shown in Table 2. The Pair Adjustment did not change between 2004 and 2012 and the Time of Day Adjustment was reduced only slightly from 1.47 to 1.45. The latter change would have resulted in a small decrease in the population estimate. The significant change was the large reduction in the detection distance from 200 meters to 125 meters which resulted in an increase in the population estimate, despite the continued population decline as monitored by the Breeding Bird Survey.

Table 2. Adjustment Factors used for the Grasshopper Sparrow Population Estimate

Year	Detection Distance	Pair Adjustment	Time of Day Adjustment
2004	200 meters	2.00	1.47
2012	125 meters	2.00	1.45

- Continental Population Objective: Partners in Flight’s (PIF) North American Landbird Conservation Plan published in 2004 (*Rich et al. 2004*) originally stated that the objective was to maintain the Grasshopper Sparrow population at current levels and prevent further decline. Later that same year, when the Population Estimates Database was made available, the population objective was to double the current population (as reflected by the target number provided for Minnesota); the PIF Plan for Minnesota also stated that the continental objective was to double the population (*Rosenberg 2004*).
- The relative abundance of breeding birds from 2006-2012, assessed by the Federal Breeding Bird Survey (*Sauer et al. 2014*), is illustrated below.

Figure 2. Relative Abundance of Grasshopper Sparrow in North America (2006-2012).



Regional

- Approximately 14% of the Grasshopper Sparrow’s population occurs in the Prairie Pothole Joint Venture region.

Minnesota

- Minnesota does not include one of the species centers of highest abundance; they occur further west.

- 4.12% of the Grasshopper Sparrow’s North American breeding range occurs in Minnesota; in 2012 0.8 % of the Sparrow’s population occurs in Minnesota (compared with approximately 1.6% in 2004).
- In 2004 the state population estimate was 246,000 (rounded down to 200,000) (*Partners in Flight Science Committee 2013, archived data*); in 2012 the state estimate was 256,000 (rounded up to 300,000) (*Partners in Flight Science Committee 2013*). As noted above, the increase is attributed to a decrease in the species assigned detectability range. Partners in Flight established a population target for the state at 500,000 (*Rosenberg 2004*). All these numbers are at best an approximation. The 2012 populations in the Minnesota portion of each Bird Conservation Region are:
 - ✓ Estimated MN population in BCR11 (Prairie Potholes): 90,000; target is 200,000
 - ✓ Estimated MN population in BCR12 (Boreal Hardwood Transition): 30,000; target is 40,000
 - ✓ Estimated MN population in BCR22 (Eastern Tallgrass Prairie): 6,000; target is 13,000
 - ✓ Estimated MN population in BCR23 (Prairie Hardwood Transition): 130,000; target is 240,000

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 Grasshopper Sparrow has a statistically significant population decline from 1966-2012 of -2.86% per year; from 2002 to 2012 it declined an average of -1.47% per year (statistically significant).

Regional BBS Data (*Sauer et al. 2014*)

- Regionally, the Grasshopper Sparrow demonstrates annual population trends shown in Table 3.

Table 3. Grasshopper Sparrow Regional Population Trends

Region	Credibility Level	1966-2012	Statistically Significant	2002-2012	Statistically Significant
Prairie Potholes	Moderate	-2.20% per year	Yes	-0.62% per year	Yes
Prairie Hardwood Transition	Moderate	-6.78% per year	Yes	-6.25% per year	Yes
Boreal Hardwood Transition	Deficiency ¹	-2.05% per year	Yes	-5.40% per year	Yes

¹This means that the data has a deficiency which may lead to imprecise results in long-term. Deficiencies include low regional abundance; small sample size (less than 14 routes with long-term data), and/or imprecise results that cannot detect a 3% per year change over the long-term (<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 -7.28% per year from 1966-2012, as well as a statistically significant decline in the past decade of -9.21% from 2002-2012.
- The Grasshopper Sparrow’s rate of population decline in Minnesota is second only to the Western Meadowlark which has experienced an average annual population decline of -8.09% per year.
- The average number of Grasshopper Sparrows per BBS route is 2.9; it was found on 65 of 82 routes.

Life History Characteristics Relevant to Recovery

Systematics: It is thought that the western subspecies, *A.s. perpallidus*, breeds in Minnesota, reaching the eastern limit of its range here. Twelve subspecies are recognized; four breed in North America (Vickery 1996).

Migration: Temperate

Climate Change Vulnerability: Low (1) (Butcher 2010); climate change models predict that the Grasshopper Sparrow will not change in distribution but will increase in abundance in Minnesota as the climate warms (Matthews et al. 2004).

Home Range and Territoriality: Male Grasshopper Sparrows actively defend their territories by singing on conspicuous song perches and wing displays. Territory size may vary anywhere from 0.19 ha to 1.8 ha. A study by Johnson and Schwartz (1993) in Montana, North Dakota, South Dakota and western Minnesota found that densities on Conservation Reserve Program lands averaged 0.21 males/ha but only 0.005 males/ha in croplands (Vickery 1996). Even though the sparrow's territory size is small (< 2 ha), the species is area sensitive, preferring larger grasslands over smaller ones. The minimum area required may range from 8 – 30 ha (Dechant et al. 1998).

Age at First Reproduction: Grasshopper Sparrows usually breed the first summer after hatching and annually thereafter (Vickery 1996).

Nesting Dates: Generally nests from late May through early July; even in the northern portion of its range Grasshopper Sparrows may produce 2 or more clutches (Vickery 1996).

Clutch Size: First clutches are usually 4-5 eggs; second clutches are generally smaller, averaging 3 eggs (Vickery 1996).

Longevity of Adults: A banding study in Florida documented a mean longevity of 2.9 years (Vickery 1996).

Food: Omnivorous species that feeds on insects during the summer, with a preference for grasshoppers, and primarily seeds in the winter, with a preference for panic grass and sedges (Vickery 1996).

Habitat Requirements and Limiting Factors related to Habitat

Habitat Categorization: Grassland

Limiting Factors during the Breeding Season

- The single most limiting factor for Grasshopper Sparrows is the availability of grasslands (native, restored and cultivated hayfields) of sufficient size for nesting. As stated above, the species is area sensitive and requires a minimum of 8-30 ha.
- In addition to its habitat size requirements Grasshopper Sparrows require grasslands with little woody encroachment and dry to well-drained sites where there is some patchiness in the vegetation and bare ground.

Area Sensitivity: Most studies show a positive relationship between the size of the available habitat and the Grasshopper Sparrow's density and occurrence (Ribic et al. 2009).

General Habitat Descriptions

From Birds of North America (Vickery 1996):

- The Grasshopper Sparrow inhabits moderately open grasslands and prairies with patchy bare ground. In the East and Midwest regions it selects sparser vegetation, e.g., tallgrass and shortgrass prairie, dry or well-drained native and cultivated grasslands and dry prairies. It is more likely to occupy large tracts of habitat than small fragments. Generally, the Grasshopper Sparrow avoids grasslands with extensive shrub cover.

From Effects of Management Practices on Grassland Birds: Grasshopper Sparrow (Dechant et al. 1998):

- Grasshopper Sparrows prefer grasslands of intermediate height and are often associated with clumped vegetation interspersed with patches of bare ground.
- Other habitat requirements include moderately deep litter and sparse coverage of woody vegetation.
- Grasshopper Sparrows breed in both native and tame grassland vegetation, including native prairie, Conservation Reserve Program (CRP) fields, pasture, hayland, airports, and reclaimed surface mines.
- Grasshopper Sparrows occasionally inhabit croplands but at a fraction of the densities found in grassland habitats.
- Although the average territory size for Grasshopper Sparrows is small (< 2 ha), the species is area sensitive, preferring large grassland areas over small areas. In Illinois, the minimum area on which Grasshopper Sparrows were found was 10-30 ha and the minimum area needed to support a breeding population may be ≥ 30 ha.

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

- The Grasshopper Sparrow is found in open grasslands and prairies such as fallow fields, pastures, idle short to medium height grasslands, dry old fields, and open barrens.
- This species is especially abundant in larger tracts of native dry prairie.
- Some bare soil is required and stiff-stemmed forbs are attractive song perches.
- It is most common in relatively short vegetation with areas of bare ground and clumps of taller dense vegetation.
- The Grasshopper Sparrow can inhabit taller grass habitats if vegetation is patchy and not overly dense.
- They prefer large tracts of habitat and are at least moderately area-sensitive.
- In Wisconsin the species is still commonly found on larger tracts of dry grassland or pasture in many parts of the state; however, most of the population probably resides on non-native grassland types on private lands.
- Despite widespread loss of native prairie, Grasshopper Sparrows adapted well to pasture and hay systems before they were too intensively managed to support grassland birds.
- Grasshopper Sparrows seem to be less abundant where Savannah Sparrows are abundant.

From USFS Region 2 Conservation Assessment (Slater 2004):

- Grasshopper Sparrows prefer grassland habitats of intermediate height (about 30 cm) with clumped vegetation interspersed with patch bare ground and sparse shrub cover.
- They avoid habitats where vegetation is less than 10 cm and appear to prefer grass heights of about 30 cm and mean grass cover values of >50%.

Threats

- The loss of grasslands currently protected under the Conservation Reserve Program may be the single biggest threat to the Grasshopper Sparrow in the Great Plains. In Minnesota alone, over 400,000 acres were lost, declining from a high of 1.8 million acres enrolled in 2007 down to 1.4 million acres in 2012 (McDonald 2013). The annual payments that farmers receive for enrolling their land in CRP can no longer compete with rising agricultural commodity prices.

From Birds of North America (Vickery 1996):

- Habitat loss, fragmentation, and degradation are the primary reasons for Grasshopper Sparrow declines; since the beginning of the 20th century, more than 99% of the native prairie has been converted to intensive agriculture in Wisconsin, Illinois and Minnesota.
- Extensive and intensive grazing in western North America has had negative impacts on this species.

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

- The Grasshopper Sparrow is a species that has suffered greatly from the intensification of agricultural efforts as it used to be abundant in hay fields, fallow fields and pastures.
- Frequent mowing, intensive grazing, changes in agricultural practices, expanding urbanization, and the invasion of non-native woody vegetation, grasses, and forbs have greatly reduced the quality of grassland habitat available to many grassland birds, including Grasshopper Sparrows.

From Effects of Management Practices on Grassland Birds: Grasshopper Sparrow (Dechant et al. 1998):

- Grasshopper Sparrows are parasitized by Brown-headed Cowbirds.

Best Management Practices

From Effects of Management Practices on Grassland Birds: Grasshopper Sparrow (Dechant et al. 1998):

- Keys to management are providing large areas of contiguous grassland of intermediate height with moderately deep litter cover and low shrub density.
- Regardless of management treatment, avoid disturbing (e.g. burning, haying, heavy grazing) nesting habitat during the breeding season, approximately mid-April to late August. Treatments can be done in early spring (several weeks prior to the arrival of adults) or possibly in the fall after the breeding season. It has been suggested that managers leave adjacent, untreated areas to provide refuge for fledglings and late or re-nesting attempts.
- In general, Grasshopper Sparrows avoid spring-burned areas in the summer immediately following the burn; overall, they exhibit variable responses to burning across their range. Johnson and Temple (1990) found lower rates of depredation on nests in recently burned (≤ 3 years) areas in Minnesota than nests in areas unburned for ≥ 4 years.
- Depending on location, mowing prior to arrival in spring can improve habitat for Grasshopper Sparrows, and may be preferable to prescribed burning.
- In areas where grass is tall or dense, grazing benefits Grasshopper Sparrows by creating patchy areas, decreasing vegetation height, and thinning dense vegetation.
- In Minnesota the abundance of Grasshopper Sparrows was higher in CRP (Conservation Reserve Program) lands than in Waterfowl Production Areas.
- Specific management recommendations are as follows:
 1. Provide areas of suitable habitat large enough to support breeding populations. In Illinois the minimum area on which the species was found was 10-30 ha and the minimum area to support a breeding population was ≥ 30 ha. Shape as well as area, of management units must be taken into consideration; perimeter-area ratio strongly influenced occurrence of Grasshopper Sparrows in Nebraska.
 2. Reduce amount of grassland edge near suburban interfaces.
 3. Treat portions of large areas on a rotational schedule to provide a mosaic of successional stages. Herkert (1994) suggests that on areas larger than 80ha that annually treated subunits should be ≥ 30 ha, or about 20-30% of the total area.
 4. In eastern portions of the Grasshopper Sparrow's range, create or maintain patches of relatively sparse, grass-dominated vegetation resembling old (>8-10 years since planted) hayfields. Plant bunch grasses on disturbed sites; bunch grasses allow openings in vegetation that facilitate foraging by Grasshopper Sparrows.

5. In eastern and Great Plains grasslands, discourage woody vegetation.
6. Maintain open grasslands by burning habitat once every 2-4 years. Treatment schedules should be adjusted during droughts as burning may reduce above-ground productivity to levels unacceptable to birds.
7. Eastern grasslands can be burned in late winter to prevent encroachment of shrubs. Disturbance should occur prior to or following the breeding season.
8. In Missouri, mowing on a 1-3 year rotation provided vegetation heights (<30cm) suitable for Grasshopper Sparrows.
9. Graze areas of tall, dense vegetation to provide diverse grass heights and densities.
10. Use various grazing systems to maintain a mosaic of grassland types.
11. In cultivated areas, use no-till/minimum-till methods when possible.

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

- Management for the Grasshopper Sparrow should seek to create the short-grass, low-litter layer conditions that are associated with this species' presence in an open, grass-dominated landscape.
- In Illinois, patches of grass >10-30 ha were needed to support this species. This can be done by restoring native dry prairies on appropriate sites or by managing non-native grassland types within a larger bird conservation area framework.
- On larger sites, seek to maintain a mosaic of grassland successional stages (treat 20-30% of total area annually) throughout the treatment area.
- Site-level management can incorporate burning, mowing, grazing or other disturbance systems as necessary to create the proper structure for this species.
- Delayed mowing, especially on public lands and airports, light to moderate grazing, and burning may be beneficial for Grasshopper Sparrows.
- Avoid treating areas during the nesting season; mowing or intensive grazing should be delayed until after July 15.
- The use of fire and light grazing can be used in alternating lots of grasslands to achieve a more heterogeneous vegetation structure that could benefit grassland birds that use a diverse continuum of vegetation structure.
- Grasshopper Sparrows will colonize a field not long after it has been burned and will tolerate moderate grazing for the diverse vegetation structure and bare areas these practices create.
- Contour strip cropping is an effective compromise between row crop production and bird conservation for attracting Grasshopper Sparrows.
- The use of native grasses and forbs in CRP plantings could benefit Grasshopper Sparrows by offering diversity in vegetation structure.
- Most old, un-managed smooth brome fields are not suitable habitat for this species and should be periodically rejuvenated through disturbance.

From USFS Region 2 Conservation Assessment (Slater 2004):

- Conservation in Region 2 (western grasslands) should focus on maintaining a heterogeneous grassland landscape that replicates conditions historically created by climate, native-species grazing, and fire. As an overriding strategy, management of native and agricultural grasslands should attempt to mimic the natural disturbance regime.
- Grasshopper Sparrows require large patches of grasslands of intermediate height and cover. The creation and maintenance of this habitat condition is best accomplished by managing multiple large patches of grassland habitat in a variety of successional stages through different or rotating management schemes.
- Habitat for grasshopper sparrows should be managed in patches greater than 8 ha, and optimal breeding habitat should include a mix of short to tall grasses (up to 30 cm), with tall forbs or scattered shrubs (<35%) and up to 35% bare ground.

- The species selects larger patches so that they can nest in interior sites and avoid edge habitats, where they suffer higher predation and parasitism rates. They were more abundant and had higher productivity, presumably due to lower predation, on large fragments >100m from a forest edge.

From the Birds of North America (Vickery 1996):

- Three primary management techniques have been used and are recommended for this species: prescribed burning, grazing, and mowing. Each has different impacts depending on the type of grassland ecosystem.
- In Midwestern agricultural areas, roadsides and grassed waterways provide breeding habitat for Grasshopper Sparrows and numerous other grassland birds, although reproductive success in these landscapes is generally low.
- Early season mowing of hayfields and other agricultural lands is generally responsible for major nest failure.
- In lush grassland habitats, (i.e. tallgrass prairie and eastern hayfields) light to moderate grazing is generally beneficial to Grasshopper Sparrows.

From Partners in Flight Physiographic Region 16 (Bird Conservation Region 23) Plan; recommendations for Grassland Birds including the Grasshopper Sparrow (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 BCAs are managed on a rotational basis so that an array of successional stages is available across the landscape at any given time.
- 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 a summary of *Habitat Recommendations* provided by D. Johnson to M. Martell via email:

Table 4. Habitat Management Needs for Grasshopper Sparrows

Vegetation Height (cm)	<134 cm
Visual obstruction reading (Robel pole)	6-40
Grass cover (%)	33-95%
Forb cover (%)	4-33%
Shrub cover (%)	<35%
Bare ground cover (%)	≤ 35%
Litter cover (%)	6-61%
Litter depth (cm)	≤ 9 cm
Frequency of grassland disturbance	Every 2-4 years

Gaps in Knowledge

From *Birds of North America* (Vickery 1996):

- Grasshopper Sparrow taxonomy—with 12 subspecies described—clearly needs a critical review; several subspecies are poorly differentiated by plumage. New techniques using a variety of DNA and protein analyses should supplement a taxonomy developed from plumage and morphometric analyses.
- Although this species is thought to be monogamous, several other grassland birds have been found to be facultatively polygynous; this may be true for the Grasshopper Sparrow as well. Detailed studies of this species’ breeding biology that include genetic analysis of parentage (“fingerprinting”) would be instructive.
- This is one of the few North American sparrows that sings two entirely separate songs. Detailed studies of the function of these two songs and of the development of song repertoire among young birds would be valuable.
- As with many other grassland birds, little is known about the winter ecology of this sparrow. A better understanding of this species’ winter distribution, habitat use, and survivorship is needed.
- Most research in the breeding season suggests that Grasshopper Sparrow reproductive success is low and that populations are not self-sustaining. Meaningful conservation requires better information about populations that function as sources versus sinks; understanding the underlying reasons for differences in reproductive success is critical. Further research that provides reliable data for demographic models, and refinement of the assumptions of these models, will foster effective conservation planning.

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

- No data has been collected on winter mortality to determine if winter survivorship is a problem.
- More detailed understanding of why reproductive success appears to be low; use of productivity data to determine how to manage habitats that will yield greater reproductive success is needed.

From *Partners in Flight Physiographic Region 16 (Bird Conservation Region 23) plan; recommendations for grassland dependent species* (Knutson et al. 2001):

- Additional research is needed on the fundamental assumptions of the Grassland Bird Conservation Area model. Specific questions include: (a) Is nesting success consistently influenced by patch size? (b) Does the amount of grassland in the surrounding landscape influence nesting success within specific patches? (c) Does forest cover negatively impact grassland bird nest success within patches? (d) How many trees create a negative impact and at what distance from nesting territories?

- Additional research is needed on the effects of various management practices (e.g., burning, haying, and grazing) on the nest success of grassland birds breeding within managed grasslands in the region.
- More information is needed on the effects of scale on grassland bird response to habitat management (i.e., is bird response to management similar on large and small patches and in landscapes with high and low levels of grass in the surrounding landscape?).
- Specific management recommendations should be tested with GIS modeling.
- Monitor populations to determine whether population objectives are being met.

From Partners in Flight Physiographic Region 40 (Bird Conservation Region 11) plan; recommendations for grassland dependent species (Fitzgerald et al. 2001):

- Monitor grassland bird populations to determine whether sustained long-term population increases of 3% per year or greater are being met for species currently in decline and that trends of non-declining species increase or remain stable.
- Evaluate and compare grassland bird population growth rates in different kinds of grassland habitats, patch sizes and landscapes.
- Acquire data on abundance, productivity and survivorship of birds to determine the ability of grassland Bird Conservation Areas (BCAs) to support source populations of grassland bird species of concern. Determine the level at which BCAs contribute to regional population increases.
- Determine the minimum area requirements of grassland birds in the Northern Tallgrass Prairie, and how densities and reproductive success of grassland bird species vary with habitat patch size.
- Investigate the dynamics of avian dispersal and colonization of sites in ephemeral systems such as Northern Tallgrass Prairie grasslands.
- Determine the influence of landscape patterns on movements of nest parasites and predators of grassland birds.
- Continue to evaluate the effects of management practices, especially burning, mowing, grazing and haying, on grassland birds.
- Continue to develop Geographic Information Systems to identify existing and potential grassland Bird Conservation Areas.

MINNESOTA CONSERVATION PLAN

Note: Janet Ruth, with the U.S. Geological Survey's Fort Collins Science Center, is currently preparing a draft Status Assessment and Conservation Action Plan for the Grasshopper Sparrow. In March 2014 an internal draft was being circulated for comment within the U.S. Fish and Wildlife Service.

Conservation Goal

Maintain a statewide population of at least 500,000 individuals of Grasshopper Sparrows.

Background: Documents prepared by the North American Bird Conservation Initiative have reported conflicting population objectives for Grasshopper Sparrows. The Partners in Flight North American Landbird Conservation Plan (*Rich et al. 2004*) stated the continental objective is to maintain the current population. However, a subsequent report, *Partners in Flight Continental Priorities and Objectives Defined at the State and Bird Conservation Region Levels for the state of Minnesota* (*Rosenberg 2004*), stated the continental objective is to double the current population.

The Rosenberg report (*2004*) states that “population objectives were determined for each species based on the degree of population change since 1966.” Species were assigned to one of four population objectives based on population trends at the continental level; the Grasshopper Sparrow was assigned to the category designated: *Double Population*. Species assigned to this category have experienced severe population declines of 50% or more over 30 years (essentially since the initiation of the federal Breeding Bird Survey in 1966). The specific objective is to double the current population of these species over the next 30 years.

In Minnesota, the Grasshopper Sparrow has declined an average of 7.28% per year since the Breeding Bird Survey was initiated, resulting in a cumulative decline of 97% over the 46 year period from 1966 to 2012. Given this severe decline, Minnesota's Conservation Plan for the Grasshopper Sparrow follows the recommendation established by Rosenberg (*2004*) to double the current population from the current estimated population of approximately 256,000 birds to at least 500,000 birds. Given the continued and increasing rate of the species' decline this target is both conservative and challenging. For example, the loss of nearly 400,000 CRP (Conservation Reserve Program) acres in Minnesota since 2007, grassland acres utilized by Grasshopper Sparrows, adds to the difficulty of achieving this target.

Statewide, the target of 500,000 birds is roughly distributed as follows (*Rosenberg 2004; the numbers total 493,000*):

- ✓ Bird Conservation Region 11 (Minnesota's Prairie Parkland Region): 200,000
- ✓ Bird Conservation Region 12 (Minnesota's Boreal Hardwood Transition Region): 40,000
- ✓ Bird Conservation Region 22 (Minnesota's Prairie Parkland Region): 13,000
- ✓ Bird Conservation Region 23 (Minnesota's Prairie Hardwood Transition Region): 240,000

Conservation Objective

Initiate conservation actions designed to halt the decline of Minnesota's Grasshopper Sparrow population and then work to increase it by approximately 2.5% per year as monitored by the Federal Breeding Bird Survey in Minnesota in the next 30 years.

Background: Increasing Minnesota's Grasshopper Sparrow population from its current estimated population of 256,000 individuals to 500,000 in 30 years would require an average annual increase of at least 2.5% per year. This is a major reversal from the sparrow's current annual rate of decline in Minnesota.

Actions Needed for Conservation

Inventory and Assessment Needs:

- Delineate grassland regions in Minnesota which support the highest abundance of Grasshopper Sparrows.

Action: Confirm the breeding status of Grasshopper Sparrows on the 14 Important Bird Areas where they have been documented nesting (see Table 1). Assess the approximate number of breeding pairs on each IBA with point counts.

Action: Confirm the status of Grasshopper Sparrows on at least eleven other Important Bird Areas that are located amidst major grassland tracts in western Minnesota.

Background: As noted earlier, Grasshopper Sparrows have been documented as migrants or summer residents on 45 of Minnesota’s 54 Important Bird Areas; nesting has been documented on twelve of these. Of the remaining 33 IBAs, at least eleven are located within major grassland units and should be inventoried more thoroughly to assess the approximate number of breeding pairs and the relative importance of each IBA to Minnesota’s Grasshopper Sparrow population. These eleven IBAs are listed in Table 5.

Table 5. Important Bird Areas in Minnesota where the Breeding Status and Relative Abundance of Grasshopper Sparrows should be Evaluated.

Agassiz National Wildlife Refuge	Lower Minnesota River Valley	Tamarac National Wildlife Refuge
Bluestem Prairie	Prairie Coteau	Twin Valley-Neal Prairie
Felton Prairie	Rothsay Prairie	Upper Minnesota River Valley
Glacial Ridge	Salt Lake	

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 overlap with any additional Important Bird Areas that should also be evaluated.

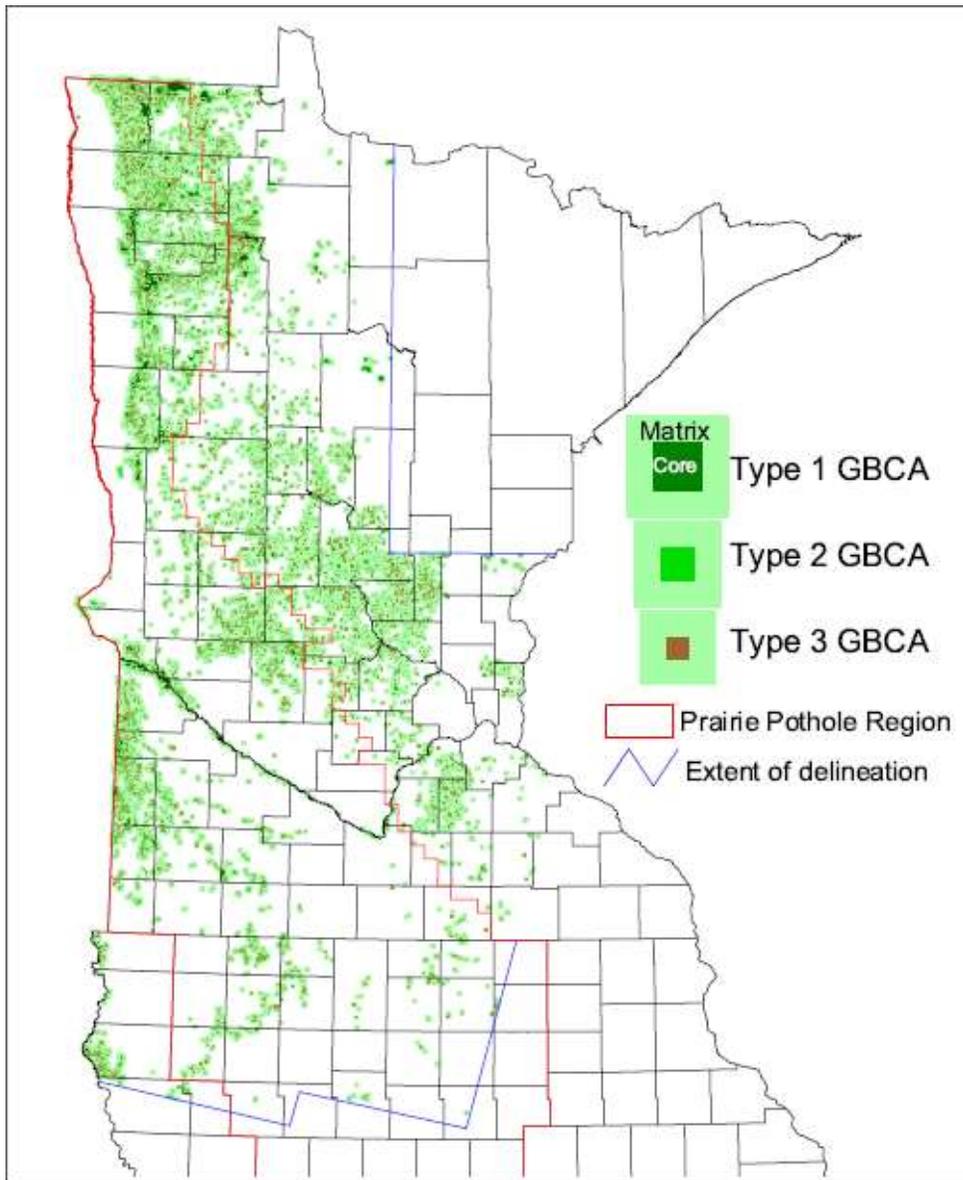
Background: In order to begin to achieve the conservation goal established in this conservation blueprint for Grasshopper Sparrows, there needs to be an assessment of whether the areas that are predicted to support high numbers of breeding birds do indeed do so. One way to approach this task is to assess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

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) 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 3.

Figure 3. 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 Grasshopper Sparrows overlap with any of the Grassland Bird Conservation Areas delineated by HAPET and further evaluate their importance to Minnesota’s Grasshopper Sparrow population.

Background: Minnesota’s Breeding Bird Atlas, conducted from 2009-2013, is a wealth of recent information on the distribution and abundance of Grasshopper Sparrows. Blocks where either 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 Grasshopper Sparrows.

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 Grasshopper Sparrows.

Background: Because the Grasshopper Sparrow is still widely distributed in 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.

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 Grasshopper Sparrows

Background: As noted earlier (*Gaps in Knowledge*), current research suggests that the reproductive success of Grasshopper Sparrows is low and that populations are not self-sustaining. If the conservation goal in Minnesota is to double the current population of 256,000 individuals, knowledge about their current reproductive success on a range of grassland sites that differ in quality and management intensity is critical to our ability to increase population levels. Although there is considerable information available on the best management practices for the bird, we need to improve our understanding of their direct relationship to reproductive success.

Note: The Minnesota Department of Natural Resources provided funding for a graduate student, Lisa Harns, working with Dr. Doug Johnson, to study Grasshopper Sparrows in Minnesota from 2012-2014. The primary focus of the project was to survey birds and measure habitat characteristics in an effort to identify priority breeding areas.

Habitat Protection Needs

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

Action: Support the native prairie and grassland habitat protection goals established by the Upper Mississippi Valley/Great Lakes Joint Venture (*Potter et al. 2007*) and the Minnesota Prairie Landscape Conservation Plan (*Minnesota Prairie Plan Working Group 2010*) and work with conservation partners to meet their combined goal of protecting nearly 480,000 acres (Table 6).

Table 6. Prairie and Grassland Protection Goals relevant to Protecting Grasshopper Sparrows in Minnesota

Minnesota Region or Joint Venture	Habitat	Bird Conservation Region	Minnesota Protection Goal
Upper Mississippi Valley/Great Lakes ¹	Grasslands	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) and portions of 22 (Eastern Tallgrass Prairie) and 23 (Prairie Hardwood Transition).

²There are additional goals established for “grasslands and wetlands” within the core areas, corridors and the agricultural matrix surrounding the core areas but the acres for wetlands and grasslands were combined (See Table 7).

³ Delineation of the core areas, corridors and agricultural matrix is illustrated in Figure 5.

Background: Habitat protection goals for the Grasshopper Sparrow 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. Although the Grasshopper Sparrow is not a focal species for grasslands in the Joint Venture region (the Eastern Meadowlark was selected as the focal species for grassland habitats), the grassland protection goals are relevant to Grasshopper Sparrows as well; these goals were 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 4). 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 Pothole Joint Venture region in Minnesota. The boundaries of both Joint Ventures and the Minnesota Prairie Region covered by the Prairie Landscape 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 cover the entire state of Minnesota.

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 5 illustrates the core areas, corridors and larger agricultural matrix.

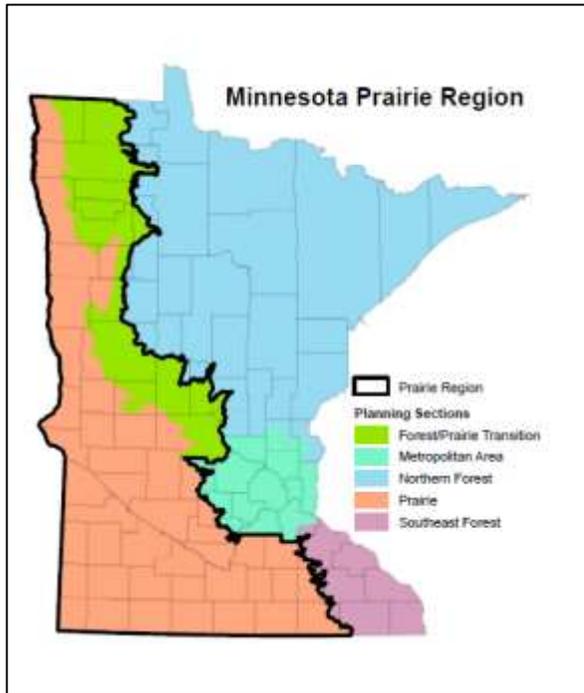
Minnesota’s Prairie Landscape Conservation Plan also establishes protection goals for the core areas, corridors and agricultural matrix and specifies what portion of each goal should be permanently protected versus voluntarily protected (Table 7). Ideally, Minnesota’s conservation community will achieve all the goals for each area, thereby benefitting Grasshopper Sparrows 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. Grassland Protection Goals from Minnesota’s Prairie Landscape Conservation Plan

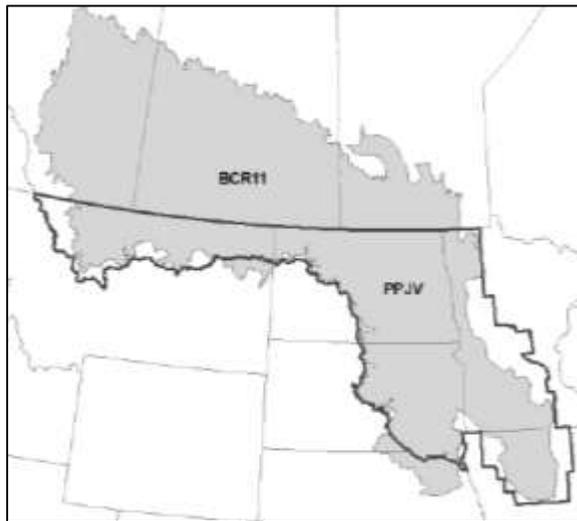
Conservation Action	Prairie Landscape Conservation Areas	Specific Conservation Action	Acreage Goals by Habitat ¹		
			Native Prairie	Non-native Grasslands	Grasslands & Wetlands
Protection	Core Areas	Acquisition/Easements	73,108 acres	88,185 acres	
		Voluntary management or conservation contracts			149,022 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	114,149 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

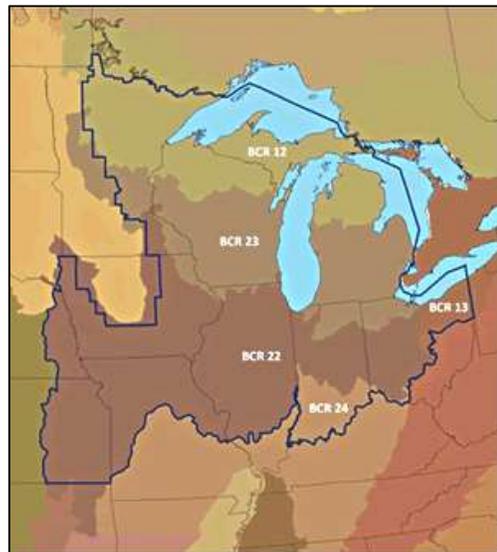
Figure 4. Comparison of the Joint Venture Region Boundaries and Minnesota's Prairie Landscape Region



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

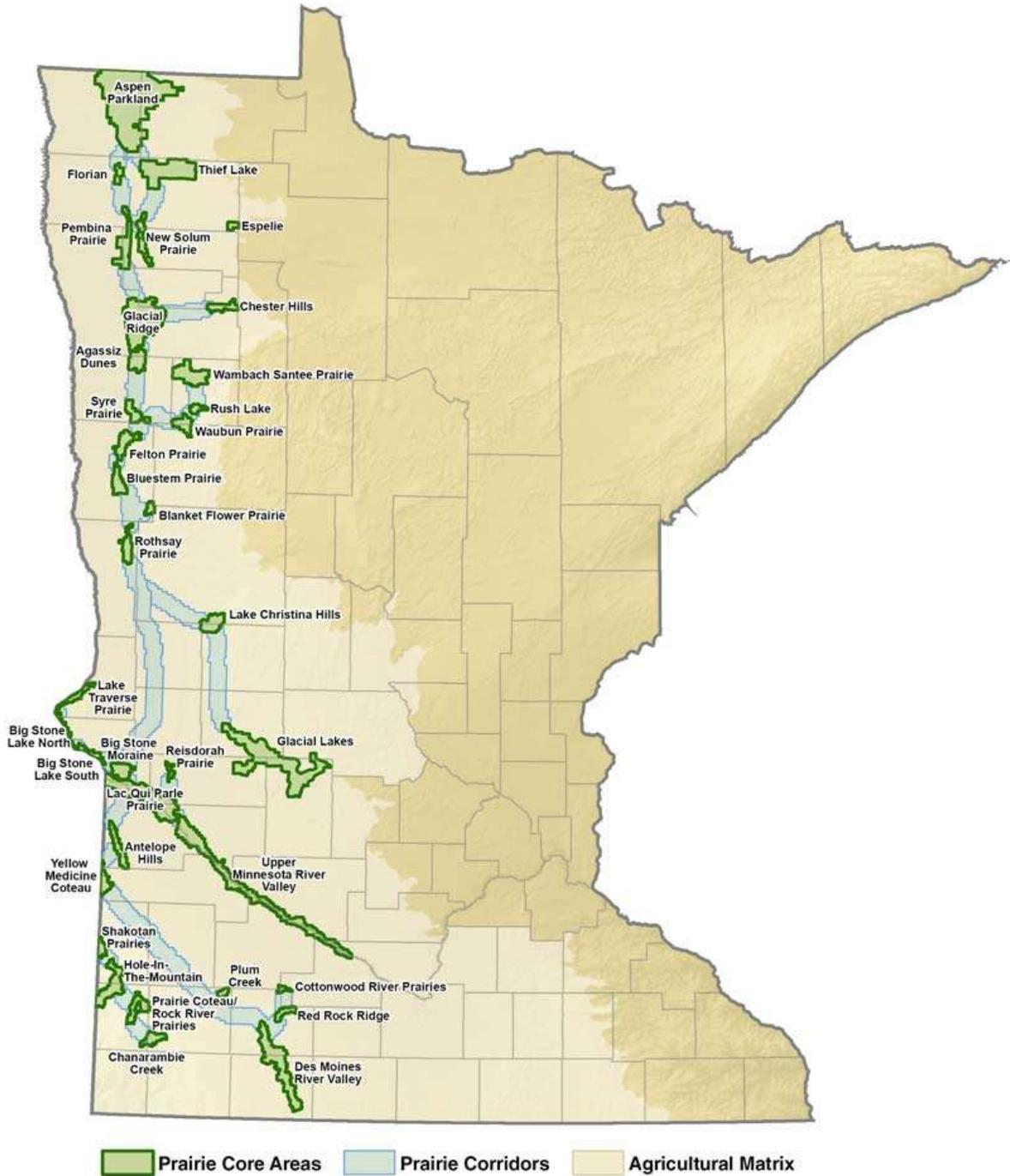


Boundary of the Upper Mississippi Valley/Great Lakes Joint Venture Region (dark blue line) with Bird Conservation Regions 12, 13, 22, 23 and 24



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

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



Habitat Restoration and Management Needs

- 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 (*Potter et al. 2007*) and the Minnesota Prairie Landscape Conservation Plan (*Minnesota Prairie Plan Working Group 2010*) and work with conservation partners to meet their combined goal of restoring nearly 400,000 acres (Table 8).

Table 8. Grassland Restoration Goals for protecting Grasshopper Sparrows in Minnesota

Minnesota Region or Joint Venture	Habitat	Bird Conservation Region	Minnesota Restoration Goal ¹
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

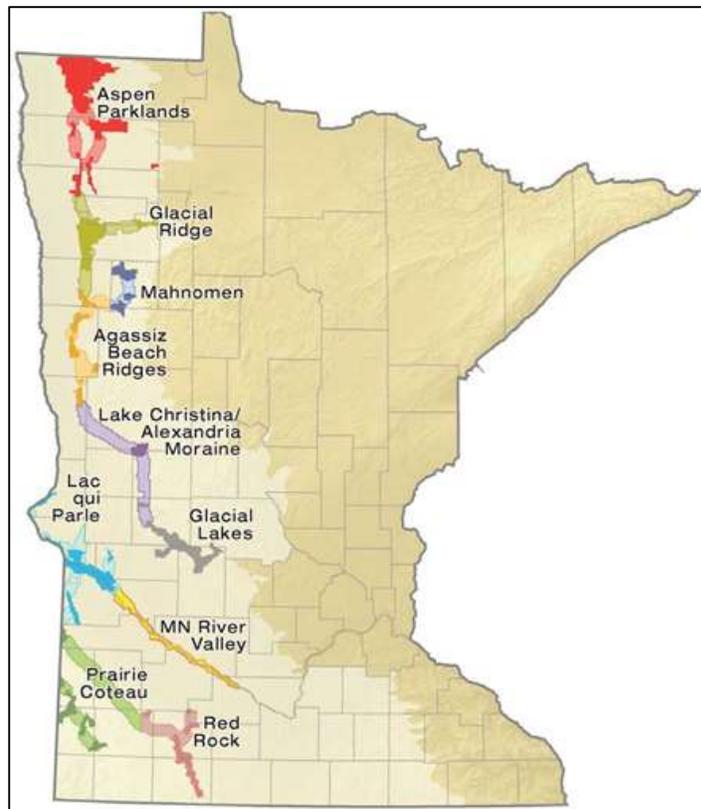
¹There are additional goals established for restoring “grasslands and wetlands” within the corridors and agricultural matrix surrounding the core areas for the Minnesota Prairie Region but the acres for wetlands and grasslands were combined and are not included in the table.

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.

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 ensure that conservation actions in the region, especially those focused on 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 6.

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



- Ensure that sites that support breeding populations of Grasshopper Sparrows 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 Grasshopper Sparrow 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 Grasshopper Sparrow 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 Grasshopper Sparrows 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 Grasshopper Sparrows.

Specific Actions for Audubon Minnesota:

- Work with its conservation partners in Minnesota to ensure that:
 1. Grasshopper Sparrows management needs are considered in grassland protection and restoration efforts.
 2. Minnesota Department of Natural Resources staff continues their statewide leadership and coordination of efforts among conservation partners to implement the Minnesota Prairie Landscape Conservation Plan goals for grassland protection and restoration.
 3. Encourage the Minnesota Department of Natural Resources and U.S. Fish and Wildlife Service staff to invest in field studies to assess the reproductive success of Grasshopper Sparrows and assess the habitat factors most critical to increasing success.
 4. The habitat requirements for Grasshopper Sparrows receive due consideration when managing public lands in the Prairie Parkland and Tallgrass Aspen Parkland ecoregions.
- 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 Grasshopper Sparrow populations on Important Bird Areas.

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

Table 9. Grasshopper Sparrow Minnesota Conservation Plan Action Summary

Conservation Goal: Maintain a statewide population of at least 500,000 individuals of Grasshopper Sparrows.

Conservation Objective: Initiate conservation actions designed to halt the decline of Minnesota’s Grasshopper Sparrow population and then work to increase it by 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 Partners
Inventory and Assessment				
<ul style="list-style-type: none"> Confirm the breeding status of Grasshopper Sparrows on 14 Important Bird Areas where they have been documented nesting (see Table 1.). Assess the approximate number of breeding pairs on each IBA with point counts. 	#1	2016	Audubon Minnesota	Minnesota DNR, USFWS
<ul style="list-style-type: none"> Confirm the status of Grasshopper Sparrows on at least eleven other Important Bird Areas that are located amidst major grassland tracts in western Minnesota. 	#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 overlap with any additional Important Bird Areas that should also be evaluated. 	#6	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 Grasshopper Sparrows overlap with any of the Grassland Bird Conservation Areas delineated by HAPET and further evaluate their importance to Minnesota’s Grasshopper Sparrow population. 	#7	2017	Audubon Minnesota	Minnesota DNR, U.S. Fish and Wildlife Service
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 Grasshopper Sparrows. 	#13	2015	Minnesota Ornithologist 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 Grasshopper Sparrows 	#9	Ongoing	Audubon Minnesota	Minnesota DNR USFWS, University, USGS
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
<i>Continued on the following page</i>				

Actions Needed for Conservation	Priority	Projected Timeline	Responsible Entity	Potential Partners
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, Watershed Districts
<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 ensure that conservation actions in the region, especially those focused on restoration and management, are guided by the plan. 	#5	Ongoing	Audubon Minnesota	USFWS, BWSR, TNC, NRCS, DNR, Watershed Districts, Private Landowners
<ul style="list-style-type: none"> Audubon Minnesota should coordinate with the land owners of the primary Important Bird Areas that support Grasshopper Sparrow populations to support the implementation of management practices that enhance and/or sustain breeding populations. 	#8	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 Grasshopper Sparrow populations in order to further the management of grasslands to support viable sparrow populations, as well as other priority grassland birds. 	#10	Ongoing	Audubon Minnesota	DNR, USFWS, TNC, Private Landowners, Watershed Districts, 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. 	#11	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 Habitat and Populations Evaluation Team (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 Grasshopper Sparrows. 	#12	Ongoing	Upper Mississippi Valley/Great Lakes Joint Venture; USFWS HAPET Office	Audubon Minnesota; Prairie Landscape Implementation Team

Selected Resources for Grasshopper Sparrow Minnesota Conservation Plan

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