EVALUATING THE WISCONSIN GRASSLAND BIRD CONSERVATION AREA MODEL

Michael R. Guttery[1], Christine Ribic[2], Andy Paulios[3], David Sample[3], and Chris Trosen[4]

[1]Department of Forest and Wildlife Ecology, University of Wisconsin-Madison
[2]U.S. Geological Survey, Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin-Madison
[3]Wisconsin Department of Natural Resources, Madison, WI
[4]U.S. Fish and Wildlife Service, St. Croix Wetland Management District

ABSTRACT

Significant population declines have been documented for many grassland bird species in recent decades. In the 1990s a grassland bird conservation area (GBCA) model was developed in Wisconsin to help reverse population declines by combining grassland conservation and working agriculture. The key concept of the GBCA model was that management must be conducted at the landscape scale rather than at the individual property. Variations of this model have been adopted by several midwestern states as well as by Partners in Flight. Despite the popularity of the model, the underlying concepts are largely based on anecdotal field observations and have not been thoroughly evaluated under a scientific framework.

OBJECTIVES

1) To estimate and compare densities and long-term population trends of focal grassland bird species in GBCAs (n=10) as well as in the surrounding focal landscapes (n=3).
2) To evaluate the relationship between habitat type (cool season grass, cropland, pasture, savanna-shrub, warm season grass, general idle grass), landscape configuration, and focal grassland bird densities within GBCAs.

STUDY SITES

- Focal landscapes (Fig. 1) were selected to largely coincide with Wisconsin DNR Grassland Habitat Restoration Areas.
- Focal landscapes were comprised of multiple cover types but were drawn to include the "grassiest" landscapes in Wisconsin.
- GBCAs were nested within focal landscapes (Fig. 1).
- GBCAs also contained a variety of cover types but were designed to include areas with the highest proportion of permanent and long-term grass cover.

STUDY DESIGN

Focal Species: We chose to focus survey efforts on 8 species: 4 grassland obligates (Eastern Meadowlark, Grasshopper Sparrow, Henslow's Sparrow, Upland Sandpiper) and 4 savanna-shrub/edge species (Field Sparrow, Brown Thrasher, Bell's Vireo, Red-headed Woodpecker).

Objective #1: We conducted 5-min 100-m fixed radius point-counts along roads within each GBCA and focal landscape. Survey points were selected using a GRTS design. Points was surveyed twice during the summer of 2012. Points were >800-m apart to ensure that surveys were independent.

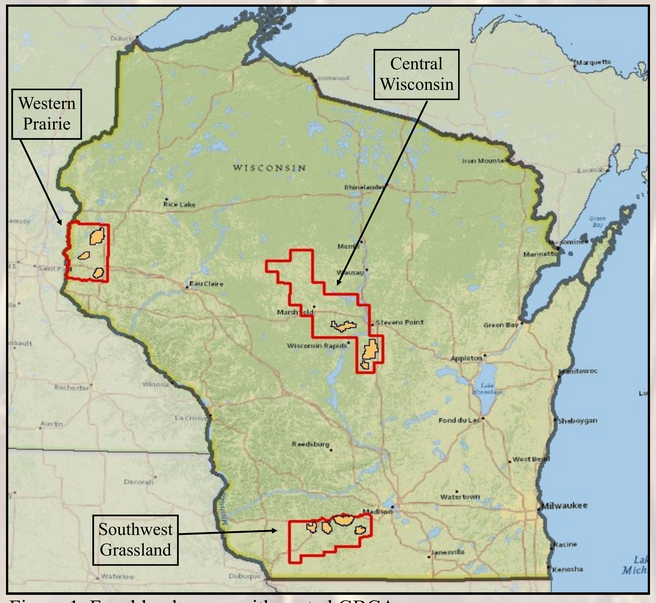

Figure 1. Focal landscapes with nested GBCAs.

STUDY DESIGN continued

Objective #2: Habitat strata were sampled using field-based point-counts selected using GRTS. At each point, we conducted a 10-min 100-m fixed radius point-count survey for focal species. Survey points were separated by >400-m.

Surveys were conducted from 30-min before sunrise to 4-hrs after sunrise on days with suitable weather. Survey periods were: 20 May to 10 June and 17 June to 8 July.

RESULTS

Objective #1: We conducted a total of 1,382 road-side point-counts during the 2 sampling periods. The 3 grassland species were significantly more common in GBCAs whereas the 2 shrub/edge species showed no clear preference for GBCAs versus the focal landscapes (Table 1). Data were analyzed using a temporary emigration adjusted binomial mixture model. For each species, abundance was modeled as a function of whether the survey point was in a GBCA or not

RESULTS continued

Table 1. Model derived density estimates (birds/100 ha) with 95% confidence intervals for focal bird species in GBCAs and focal landscapes

Species	GBCAs	Focal Landscapes
Eastern Meadowlark	26.1 *(18.3 : 37.0)*	11.6 *(7.9 : 17.0)*
Grasshopper Sparrow	24.1 *(13.5 : 42.9)*	3.1 *(1.5 : 6.5)*
Henslow's Sparrow	5.6 *(3.4 : 9.4)*	1.2 *(0.5 : 2.6)*
Field Sparrow	2.2 *(1.2 : 4.2)*	1.7 *(0.8 : 3.3)*
Brown Thrasher	10.8 *(4.6 : 25.4)*	5.9 *(2.4 : 14.6)*

Objective #2: We conducted a total of 473 field-based point-count surveys across the 2 sampling periods. Bird densities were consistently low in croplands (Table 2). These data are for the first sampling period only. Cover maps used for the 2012 sampling design were created in 2010 so some points were not in the anticipated habitat type. As such, these results are preliminary. We are currently updating GBCA cover maps. Once updates are complete, we will reanalyze these data to obtain corrected densities.

Table 2. Model derived density estimates (birds/100 ha) with 95% confidence intervals for focal bird species in various habitat types.

Species	Cropland	Pasture	CSG	WSG	Savanna	General
EAME	1.7 *(0.6 : 4.8)*	25.8 *(15.2 : 43.8)*	14.9 *(9.5 : 23.3)*	11.1 *(5.2 : 23.6)*	4.2 *(0.5 : 35.0)*	3.8 *(1.1 : 12.7)*
GRSP	4.9 *(2.5 : 9.5)*	35.5 *(20.7 : 60.8)*	37.1 *(25.2 : 54.6)*	34.9 *(19.0 : 64.4)*	8.1 *(1.5 : 43.6)*	27.1 *(13.7 : 53.5)*
HESP	0.4 *(0.1 : 3.0)*	3.3 *(1.2 : 9.6)*	23.7 *(15.9 : 35.4)*	9.7 *(4.3 : 21.6)*	0.1 *(0.0 : ∞)*	11.5 *(5.0 : 26.1)*
FISP	1.8 *(0.6 : 4.9)*	0.8 *(0.1 : 6.1)*	3.4 *(1.6 : 7.3)*	4.4 *(1.4 : 13.2)*	8.1 *(1.5 : 44.5)*	7.5 *(2.8 : 19.7)*
BRTH	0.4 *(0.1 : 3.2)*	1.7 *(0.4 : 6.9)*	1.3 *(0.4 : 4.1)*	0.0 *(0.0 : ∞)*	8.4 *(2.1 : 33.9)*	0.0 *(0.0 : ∞)*

Results from the 2012 pilot study will be used to establish baseline bird densities, set management objectives, and refine the study design. Surveys will be repeated across all landscapes in 2013 and 2014.

ACKNOWLEDGEMENTS

We thank the many volunteers who assisted with bird surveys. This study was funded by the U.S. Geological Survey Science Support Partnership Program, Wisconsin Department of Natural Resources, and U.S. Fish and Wildlife Service.