

Section-based Monitoring of Grassland Birds on Grand River National Grassland



Photo: Northern Harrier by Tony Leukering

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Executive Summary

Based on increased declines of grassland bird species, the South Dakota Department of Game, Fish and Parks and Rocky Mountain Bird Observatory recognized the need to monitor breeding bird populations in Northwest South Dakota, specifically on the Grand River National Grasslands. The objectives of this study were to: 1) use monitoring techniques to determine population trends and distributions for breeding birds on Grand River National Grassland, and 2) to determine how current land management practices are influencing shortgrass prairie bird populations within northwest South Dakota.

In 2004, we conducted a breeding bird survey of Grand River National Grassland using a section-based survey method (Hanni 2002) developed in 2001 in coordination with the Colorado Division of Wildlife. This particular method is currently being conducted in 7 states. Following this method, a total of 132 point counts on 44 sections were conducted during the 2004 field season. In this report we present: 1) density estimates for seven species, and 2) species distribution maps for 25 species. We also provide a map marking observation locations for three species tracked by the South Dakota Natural Heritage Program (Rare, Threatened or Endangered Animals Tracked by The South Dakota Natural Heritage Program 2002).

Ultimately, this information along with data from the other seven states, will be used to indicate population trends, shifts in distribution and to evaluate habitat use of grassland birds in northwest South Dakota.

Introduction

Grassland birds have experienced steeper, more consistent, and geographically more widespread declines than any other guild of North American avian species (Sampson and Knopf 1996). The North American Landbird Conservation Plan recognizes the importance of monitoring bird species and serves as a blueprint for continental habitat conservation under the North American Bird Conservation Initiative (NABCI); (Rich et al. 2004). Partners in Flight (PIF) found that 11% of upland breeding grassland bird species are declining and 74% lack enough data to assess population trends and stability (Partners in Flight Species Assessment Database 2004) in the Prairies and Badlands Bird Conservation Region (BCR) 17 as designated by NABCI.

Some managers have relied on data derived from the Breeding Bird Survey (BBS), currently the best and most extensive bird-monitoring program, to monitor bird populations (Robbins et al. 1989, Sauer 1993). The BBS, operational in the Great Plains since 1967, uses volunteers to conduct roadside surveys of birds across North America and produces indices of population abundance at the continental scale for many common bird species (Robbins et al. 1989). BBS data and analyses are relatively inexpensive and have proven to be a very valuable source of information on bird population trends. BBS

data can be used to produce continental-scale relative abundance maps. These maps provide a reasonably good indication of the relative abundances of species that are well sampled by the BBS. However, many species and habitats are inadequately sampled by the BBS (Robbins et al. 1993, Sauer 1993), and BBS data do not reliably predict population trends at small geographic scales such as a National Grassland (Sauer 2000). For these and other reasons, BBS data are generally insufficient to guide local and regional management decisions (Leukering et al. 2000), such as those of National Grassland managers.

The Rocky Mountain Bird Observatory (RMBO), in cooperation with the Colorado Division of Wildlife (CDOW), assessed field techniques in 2001 to determine which was most efficient for monitoring shortgrass prairie birds. We evaluated four techniques that were randomly allocated across the shortgrass prairie of Colorado: 1) section-based point counts, conducted at the section level from roads (n = 1,237 sections), 2) interior line transects, conducted at the section level away from roads (n = 48 sections), 3) Monitoring Colorado's Birds (MCB) point transects, conducted irrespective of sections and roads (n = 22 point transects), and 4) 30-mile driving line transects, conducted along roads, through all habitat types in Colorado (n = 87 line transects). We used program DISTANCE to estimate bird densities using each of the four techniques. The results suggested that the section-based point count technique was the most efficient in monitoring birds in the shortgrass prairie (Hanni 2002). Hereafter, we refer to this technique as section-based surveys.

In 2001, CDOW and Nebraska Game and Parks Commission, in cooperation with RMBO, employed the section-based surveys in response to a need for more intensive avian monitoring in Nebraska's shortgrass prairie regions. Since then, Kansas, Oklahoma, New Mexico, and the Forest Service have also implemented section-based monitoring programs (Hanni 2002) (Figure 1).

In 2004, the South Dakota Department of Game, Fish and Parks and RMBO entered into an agreement to use monitoring techniques to determine population trends and distributions for breeding birds and to determine how current land management practices are influencing shortgrass prairie bird populations within northwest South Dakota. To address this we implemented similar monitoring protocols throughout an eco-region including northwest South Dakota.



Figure 1. Sections surveyed in 2004 by habitat type.

Methodology

We conducted section-based surveys on Grand River National Grassland. Section-based surveys designate 1-mi² sections of land as the sampling unit. This unit was chosen because it is the common unit of land management in several Great Plains states and most roads are laid-out accordingly. Sections are surveyed through road-based point counts. This technique is the most efficient surveying technique for collecting bird data over a large area (Hanni 2002).

Data was collected on Grand River National Grassland 11 (?) – June 14, 2004. Below are detailed description of how we selected survey sections, how sections were surveyed, and what data were collected.

Section Selection

A point count data collection process modified from Buckland et al. (1993) was established using Public Land Survey System (PLSS) 1-mi² sections as sampling units. Sections qualifying for section-based surveys contained 600-700 acres of monotypic habitat type and were adjacent to at least one accessible road. Using a Geographic Information System (GIS), we identified qualifying sections and, from those, randomly selected sections to be surveyed (Figure 2).

Road-based Point Counts

On each surveyed section, we conducted three road-based point counts spaced at least 0.2 mi (322m) apart. Four point counts per section does not yield a statistically significant difference in the number of species detected (Hanni 2002). Point count locations were distributed around sections based on the number of roads surrounding the selected sections. For example, on sections adjacent to only one road, three counts were conducted. On sections with two roads, two counts were conducted along one road, and one count was conducted along the other; the road on which two counts were conducted was randomly selected using a random number table. On sections bordered by three roads, one count was conducted along each road. Where four roads surrounded the section, one road was randomly selected and eliminated using a random number table, and the section was then treated as a three-road section. We used a random number table to select point count locations along each road. Point counts were conducted for five minutes looking from the road 180° into the section. All species of birds seen and/or heard within this area were recorded.

We treated all dependent detections of individual birds as part of a 'cluster' together with the first independently observed bird, rather than as separate independent observations of those individuals. This means that if the detection of an individual bird is dependent upon the previous detection of another individual, the resulting observation is recorded as one independent detection with a cluster size of C, where C is the original individual detected plus the sum of any additional individuals detected as a result of the first

individual revealing its presence. For example, a bird sings, and is thus detected independently, as a result, the observer detects a second individual. The resulting observation is recorded as a single detection with a cluster size of two birds. This practice ensures that we adhere more strictly to the assumption inherent in random sampling that all observations are independent of each other.

Distance from the observer to the point of first detection was also recorded for each bird observed. Distances were determined using a Bushnell Yardage Pro 500 Rangefinder. Method of detection (e.g., visually, aurally), sex (if known), and habitat (e.g., shrub, ground, fence, etc.) were recorded. Birds flying over the section were tallied separately. Locations of the points were recorded using a Garmin *etrex* global positioning system (GPS) unit. Township, range, and section (TRS) were also documented.

Observers conducted point counts from sunrise until no later than 1100 hrs when detectable activity typically slowed or ceased. We also recorded survey “start” and “end” times. Surveys were not conducted during times of rain or wind in excess of 18 mph. Observers recorded weather conditions such as percent cloud cover, wind speed (Beaufort Scale), and temperature in Fahrenheit. In addition to point count data, we documented vegetation characteristics, and locations of raptor nests and black-tailed prairie dog colonies.

We recorded vegetation characteristics within a 150- m radius of each point count looking into the surveyed section. Data collected included grass height, proportion of grass in each height category, percent shrub cover, and dominant shrub cover species. Data for grass height were collected using two categories, <15 cm, and >15 cm (~ankle height). If there was a combination of the two heights, the proportions in each category were recorded. Shrub cover data were recorded only where a shrub community was present. Technicians were provided with a reference guide to shrub percent that gave examples of shrub percent for each of the different shrub species to be encountered in the field. The categories were <1%, >1%-3%, >3%-10%, and >10%. These percentages were recorded for shrubs observed during the survey.

Sections Surveyed on Grand River National Grassland in 2004

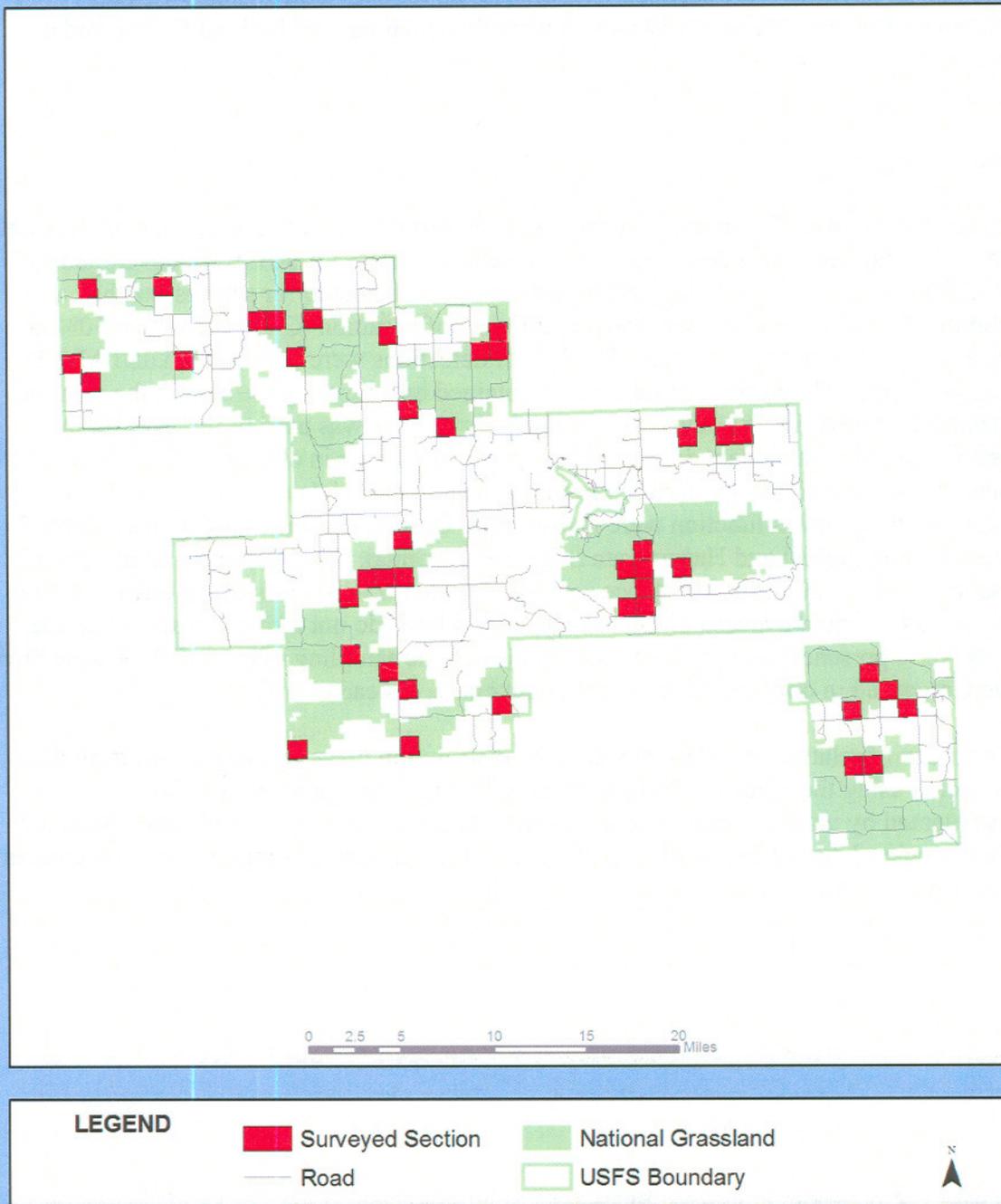


Figure 2. Sections surveyed in 2004 on Grand River National Grassland.

All black-tailed prairie bog colonies and playa wetlands visible within the section were sketched by the observer onto the data sheet. All black-tailed prairie dog colonies were documented on maps and in notes, regardless of location on National Grassland, private or state-owned land. All black-tailed prairie dog colonies, either occupied or abandoned, and playas wetlands were scanned with binoculars for both Burrowing Owls and Mountain Plovers. Nests of any raptors were documented with both GPS units and on maps.

Data Analysis

Program DISTANCE version 5.0 (Thomas 1998-99) was used to analyze the point count data. The notation, concepts, and analysis methods of DISTANCE were developed by Buckland et al. (1993). Density estimates (D) were calculated for species that had a minimum of 20 observations or had a coefficient of variation (CV) of less than 50%, a level which indicates robust data. No flyover detections were used in the DISTANCE analysis. In 2004, density estimates were obtained by analyzing the data in the form of dependent observations or clusters. Analysis by clusters was used to improve on the assumption of independent detections for species occurring in clusters and to reduce the bias of detecting clusters at farther distances. The four models used to find the most appropriate detection function were Half-normal Cosine, Uniform Cosine, Half-normal Hermite Polynomial and Hazard-rate Simple Polynomial. Analysis using DISTANCE assumes that: 1) all birds at distance zero are detected, 2) distances of the birds close to the points or line are measured accurately, and 3) birds do not move in response to the observer's presence. In this analysis, we adjusted the sampling effort to 0.5 because birds were recorded in only 180° of the point count circle, instead of 360°.

The index of relative abundance used in the distribution maps was calculated from data collected using the road-based point count technique. The index of abundance, represented by graded map symbols, was defined as the total number of individuals for each species detected on the section divided by the number of point counts conducted on that section.

Results

We conducted 132 point counts on 44 sections in Grand River National Grassland and observed 35 species. We calculated density estimates for seven species (Table 1). Appendix A presents species distribution and relative abundance index. Appendix B presents species observed and number of detections.

We observed three species tracked by the South Dakota Natural Heritage Program (Rare, Threatened or Endangered Animals Tracked by The South Dakota Natural Heritage Program 2002), Swainson's Hawk (*Buteo swainson*, $n = 6$), Baird's Sparrow (*Ammodrammus savannarum*, $n = 4$), and Sprague's Pipit (*Anthus spragueii*, $n = 11$). Observations were too small to calculate density estimates for any of these species but observation locations are documented in Figure 3.

Table 1: Density estimates of birds observed during road-based point counts on the Grand River National Grassland, 11-14 June, 2004.

Species	EDR	D	D LCL	D UCL	D CV	n
Upland Sandpiper	69.84	21.96	10.04	48.04	41%	19
Horned Lark	51.19	69.93	37.12	131.74	33%	30
Lark Bunting	94.91	55.48	37.56	81.95	20%	87
Grasshopper Sparrow	49.70	181.84	95.93	344.69	33%	82
Chestnut-collared Longspur	69.14	149.38	107.07	208.41	17%	133
Western Meadowlark	111.18	54.38	31.65	93.40	28%	128
Brown-headed Cowbird	57.39	84.07	49.44	142.95	27%	45

EDR = Effective detection radius, D = Density estimate expressed in birds/km², DLCL & DUCL = lower and upper confidence limits of D, n = number of detections used to obtain density estimates, DCV = coefficient of variation, $p = 0.05$.

Rare Threatened or Endangered Birds tracked by the South Dakota Natural Heritage Program

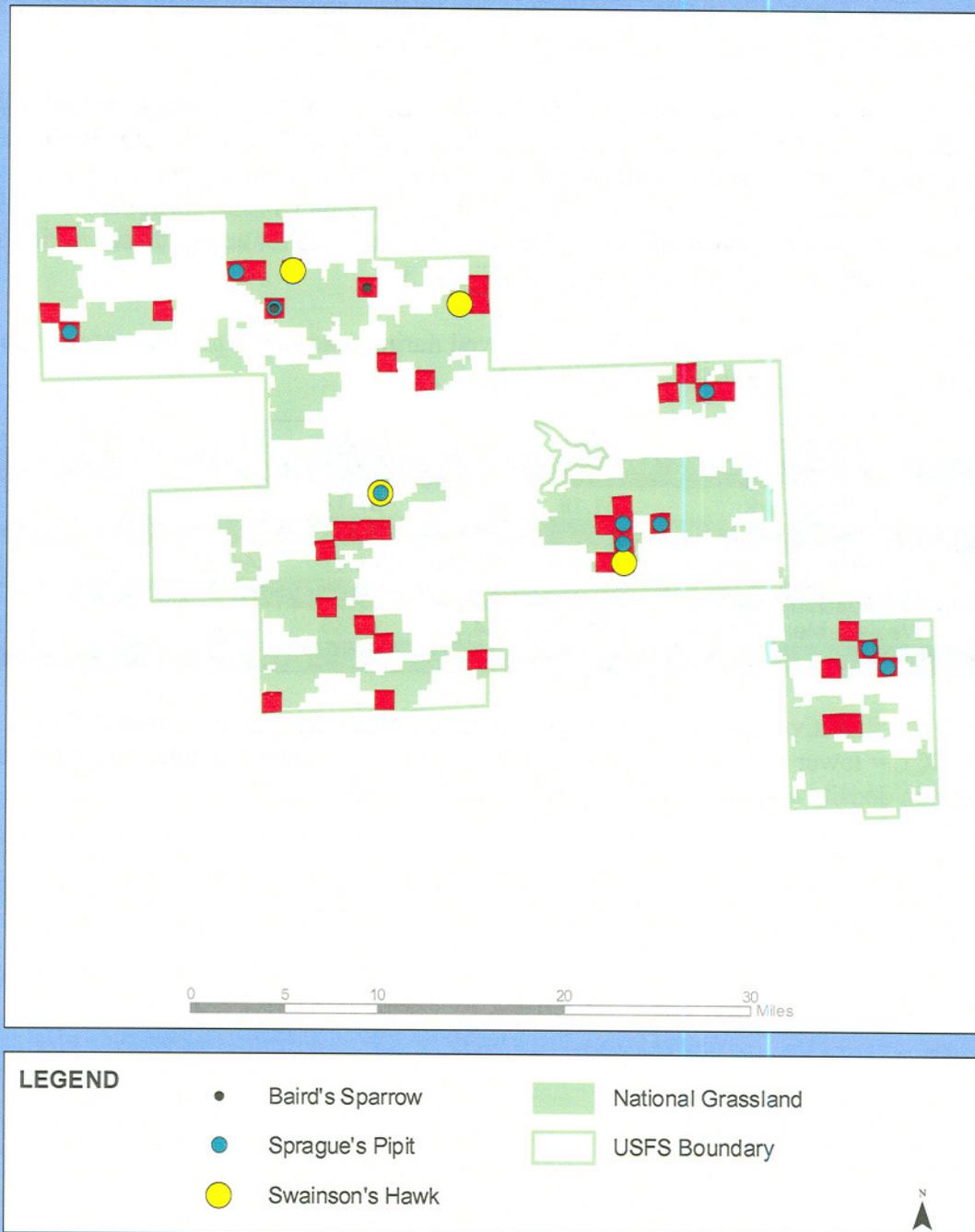


Figure 3. Site location for detected species listed on the “Rare Threatened or Endangered Birds Tracked by the South Dakota Natural Heritage Program” (2002).

Discussion and Recommendations

In 2004, using section-based surveys, we collected data that allowed us to calculate density estimates for seven species detected on Grand River National Grassland, located in northwest South Dakota.

According to the North American Landbird Conservation Plan (Rich et al. 2004), three species we were able to calculate density estimates for - Chestnut-collared Longspur, Lark Bunting and Grasshopper Sparrow - are stewardship species in the management, planning and responsibility category requiring continual monitoring to maintain and improve populations within the Prairie Avifaunal Biome.

Four species, Swainson's Hawk, Short-eared Owl, Baird's Sparrow, and Sprague's Pipit had insufficient detections to calculate densities, but are listed in the North American Landbird Conservation Plan (2004). Baird's Sparrow is in need of immediate action, Short-eared Owl, Swainson's Hawk and Sprague's Pipit are in the management, planning and responsibility category (Rich et al. 2004). Although we were not able to provide density estimates for these species due to low number of detections we can use abundance numbers to observe frequency of occurrence within micro-habitat types to develop more intense monitoring techniques.

Density estimates are directly related to habitat conditions with bird species occurring in higher densities where there is suitable habitat. In establishing bird monitoring at the grassland scale, important data is obtained with regard to frequency of occurrence and habitat types species are found in. National Grasslands form an integral part to understanding bird ecology and fostering historic grassland conditions.

This monitoring technique allows us to evaluate these data at different scales which will permit us to compare local to regional results. Monitoring at a local scale will result in more informed land management decisions regarding conservation of grassland birds and their habitat. For example, data collected through section-based monitoring can be used to link habitat types or management practices to bird counts. Permanently marked point count locations can be related to base vegetation using GIS layers or to management practices using Department of South Dakota Game, Fish and Parks records. Correlations can then be drawn among avian trends, densities, diversity, and management practices. Evaluating management practices based on population trends and distributions will enable RMBO to focus conservation efforts and help land managers make decisions that conserve prairie birds in northwest South Dakota.

A disadvantage of our section-based monitoring program, which is also shared with BBS, is the potential road bias resulting from the road-based surveying technique. Several species of grassland birds are biased toward roads (e.g., Horned Lark and Western Meadowlark; Hanni 2003) and some are biased away from roads (e.g., McCown's Longspur, Chestnut-collared Longspur; Hanni, unpublished data). We attempted to generate a correction factor in order to make the density estimates more accurate. Unfortunately, due to the large number of variables that may contribute to the road bias in

the technique, we were unable to calculate a dependable correction factor. The road-based point counts are being compared to un-biased point transects to determine a variable for each species for which there are density estimates from both techniques. The correction factor will compensate for the density estimate generated, from road-based point counts, and should offer a more accurate population estimate for individual species.

Overall, section-based monitoring at a local scale is inexpensive, defensible, site-specific, and habitat-specific. It fills an important management need at a modest cost. However, there should be no expectation that this technique will detect trends for all grassland bird species. No single technique can accomplish such an assessment of all grassland birds. Section-based monitoring provides an overview of the avian community and can be used to identify areas in need of particular management attention, resulting in more effective conservation of Great Plains birds in northwest South Dakota.

Acknowledgements

We thank the South Dakota Department of Game, Fish and Parks for funding the project, and also the staff at Rocky Mountain Bird Observatory. Without the help of the 2004 field crew this project would have not been possible.

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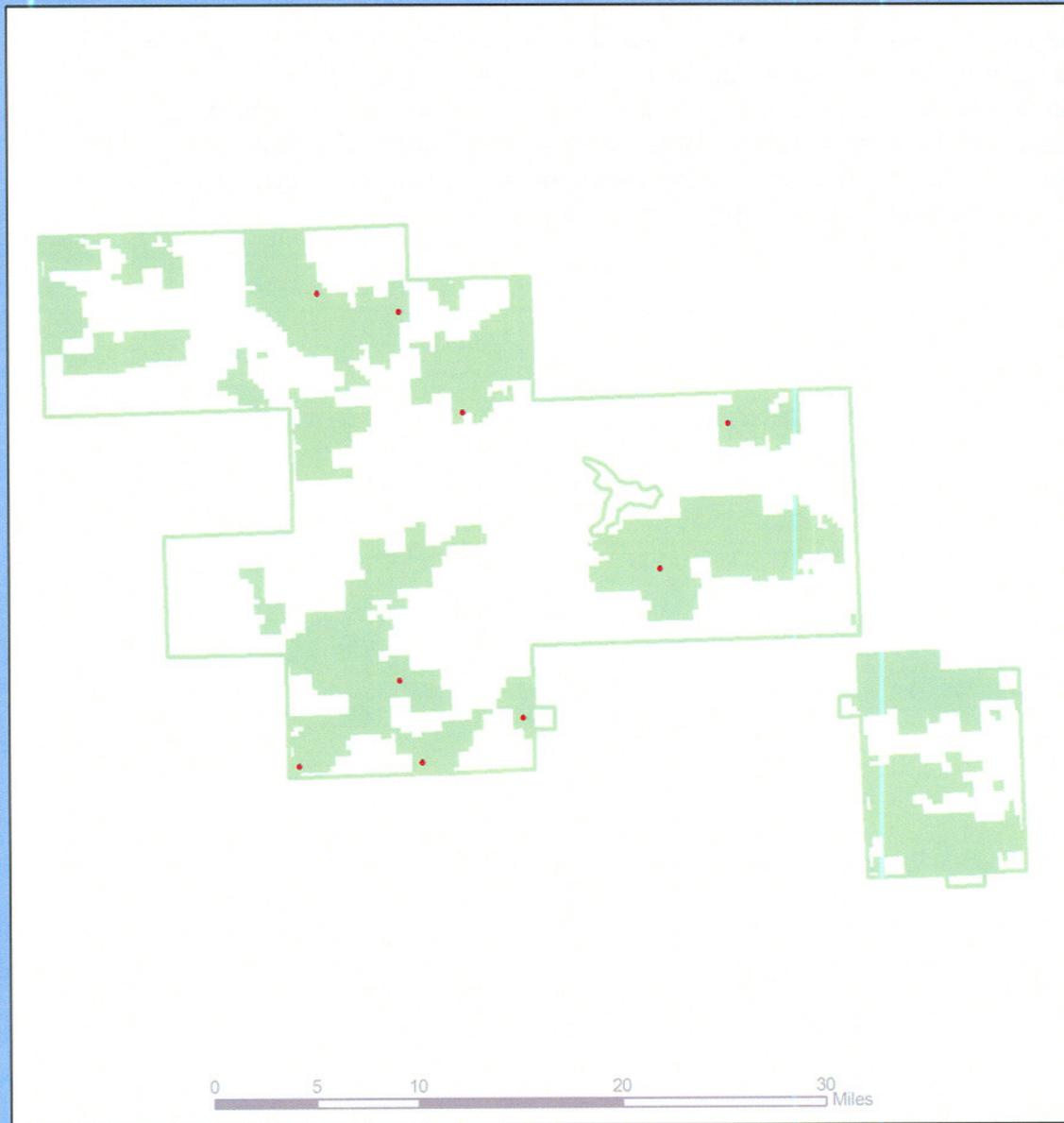
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APPENDIX A - Species Distribution Maps

The following distribution maps are based on data collected using the road-based point count survey technique under the section-based monitoring program. The distribution map for each species indicates locations of all observations graded by index of abundance. Index of abundance is defined as the number of individuals of a species observed on a section divided by the number of point counts conducted on that section. Index of abundance was created to account for effort.

Ring-necked Pheasant



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

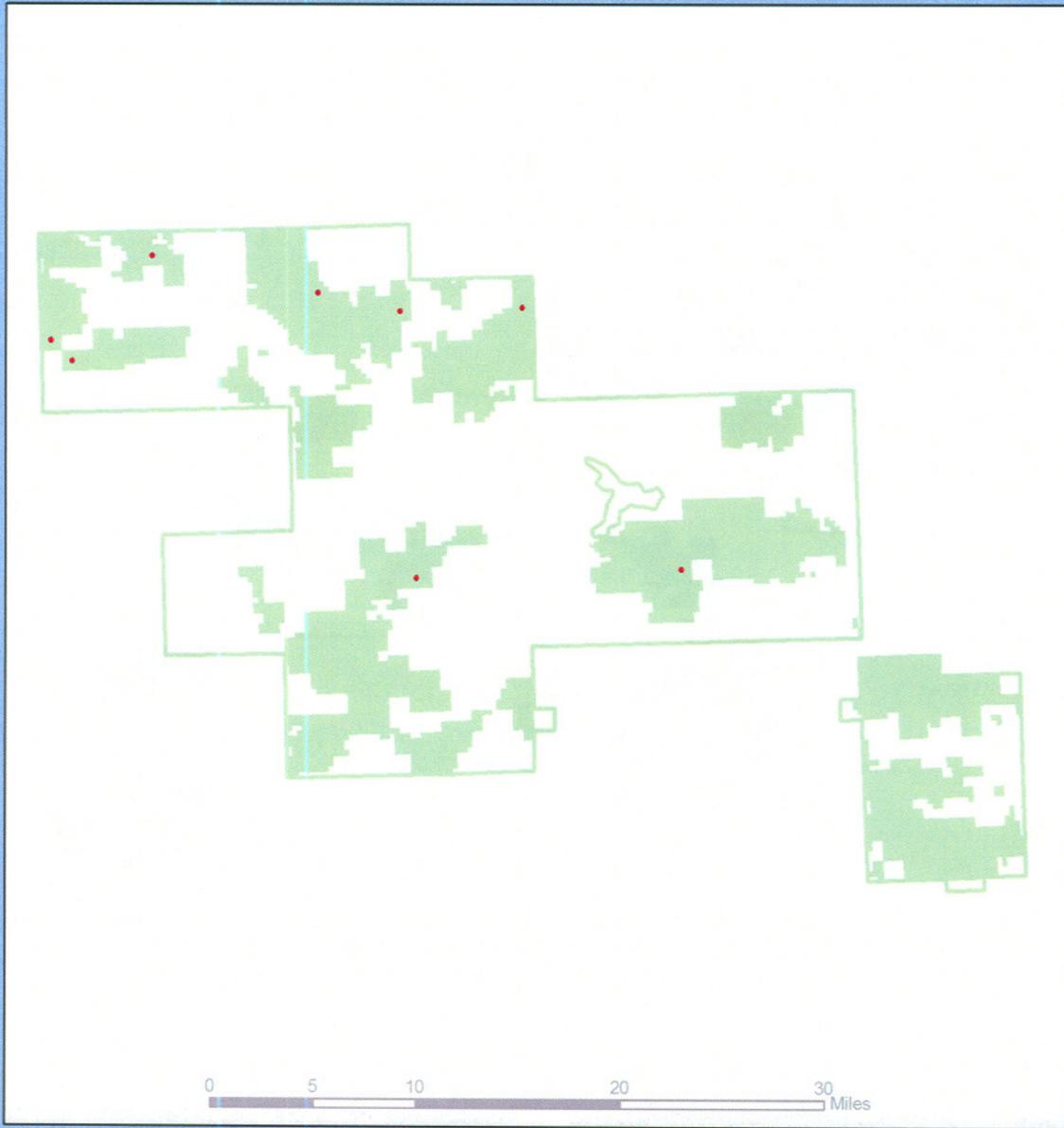
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Northern Harrier



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

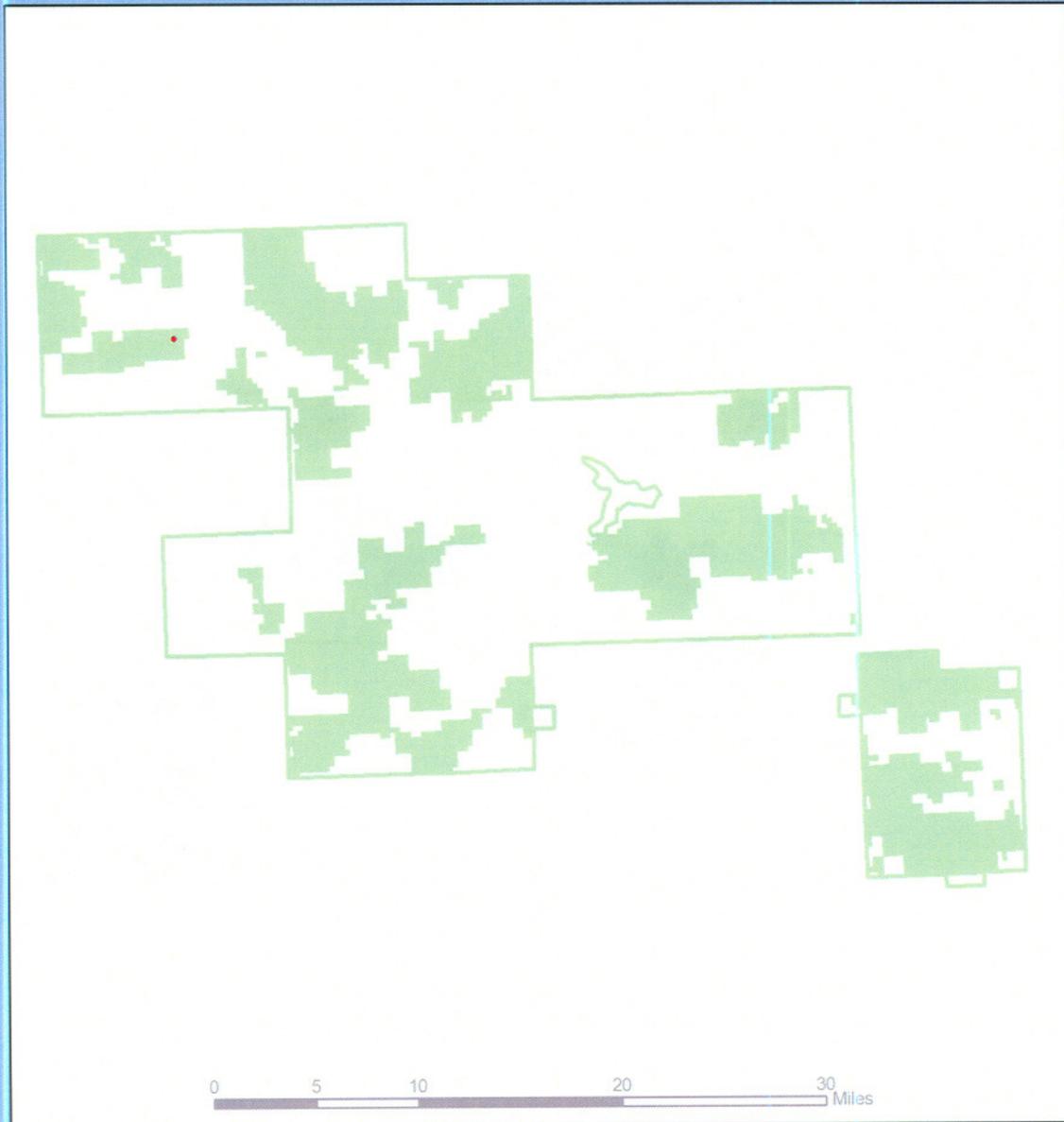
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Red-tailed Hawk



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

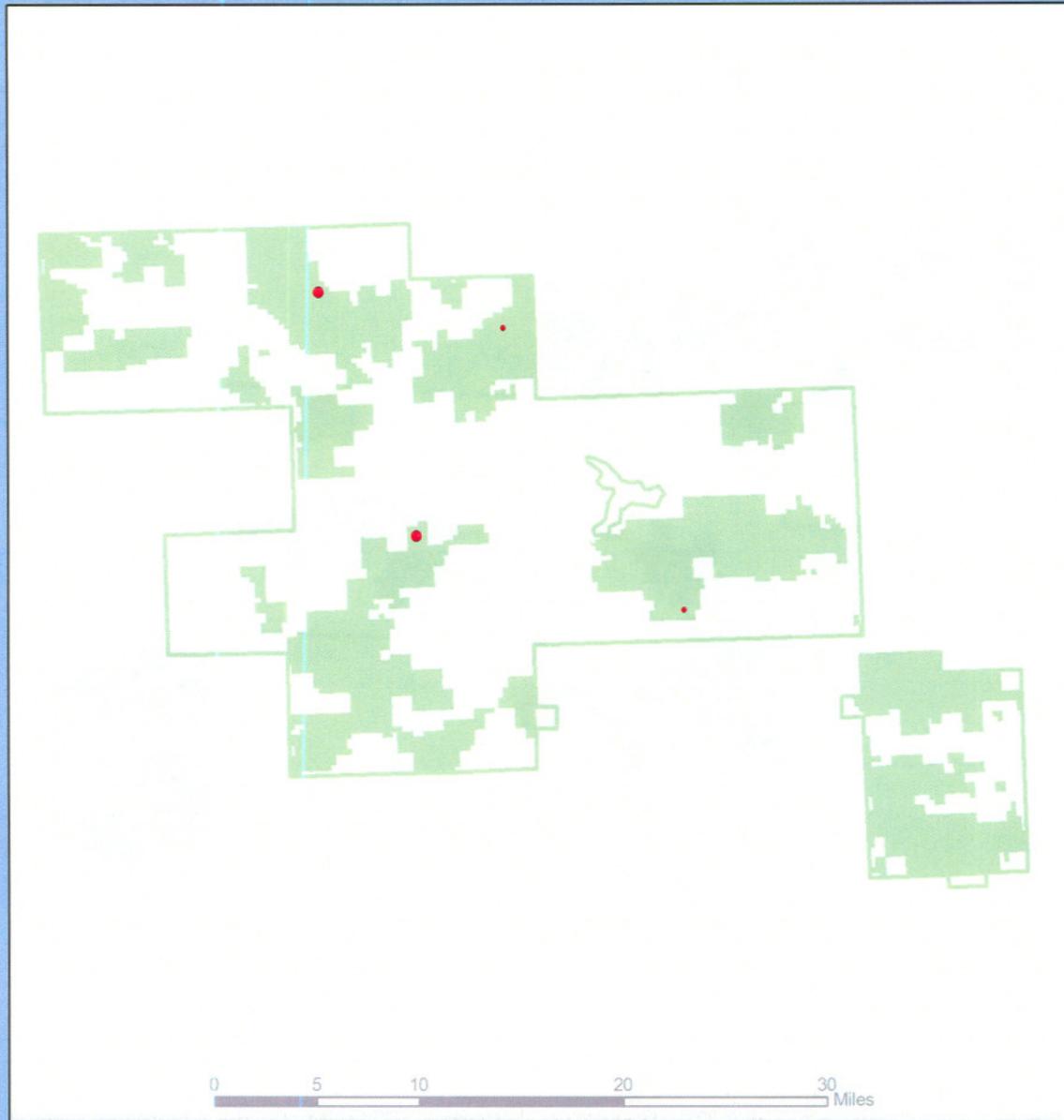
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Swainson's Hawk



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

• 0.67

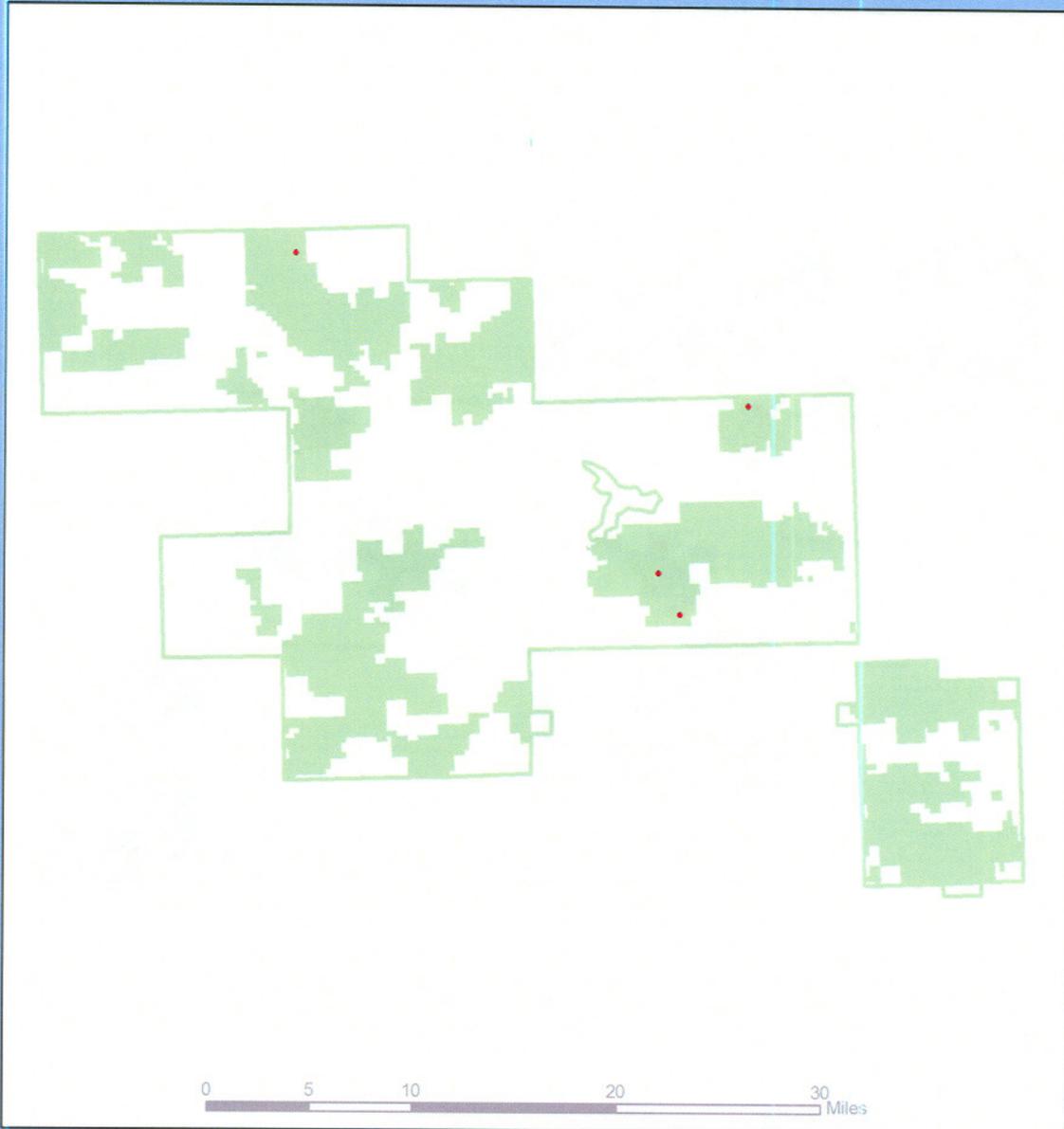
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Killdeer



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

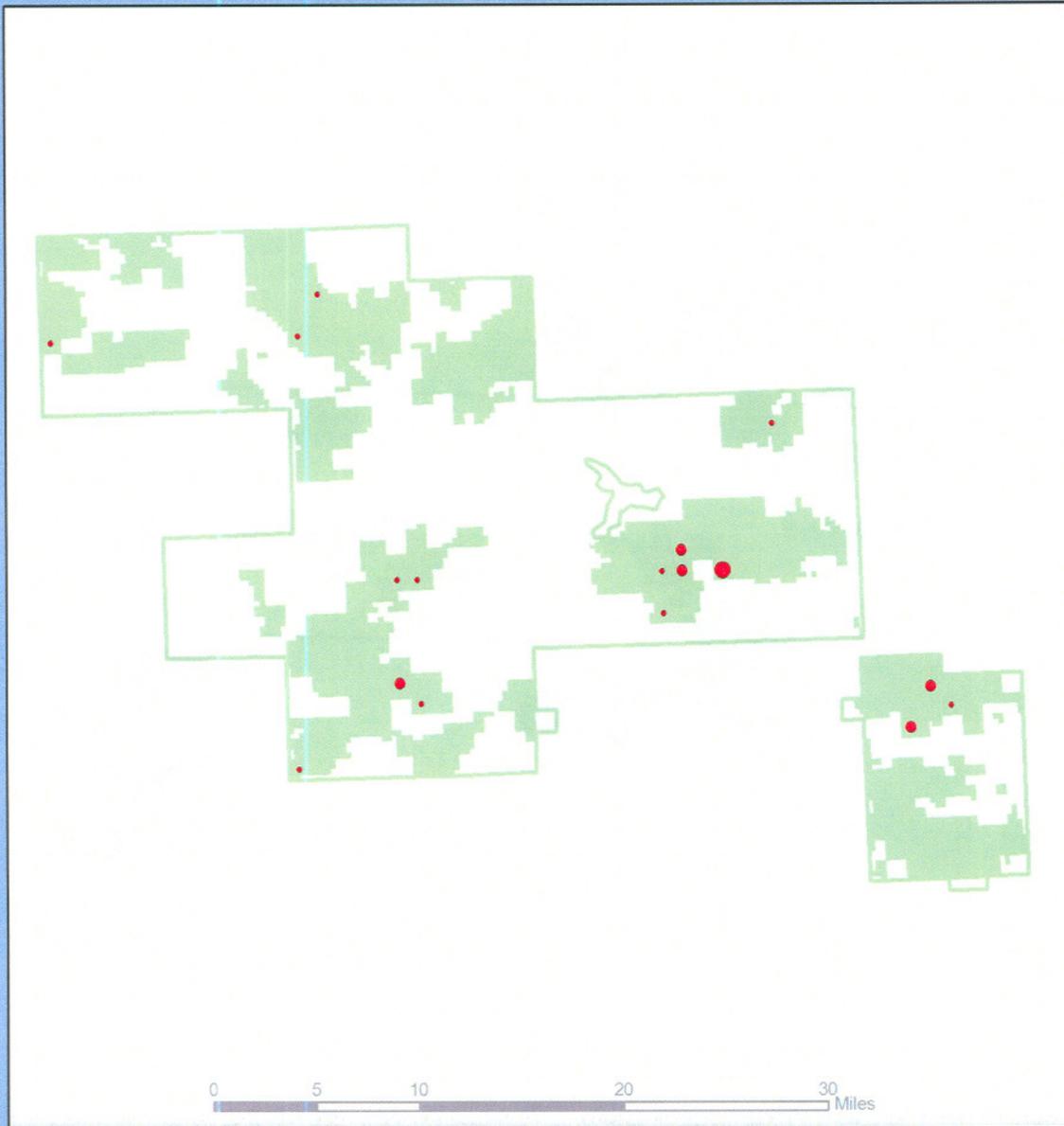
 National Grassland

 USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Upland Sandpiper



LEGEND

Index of Abundance (birds/section/effort)

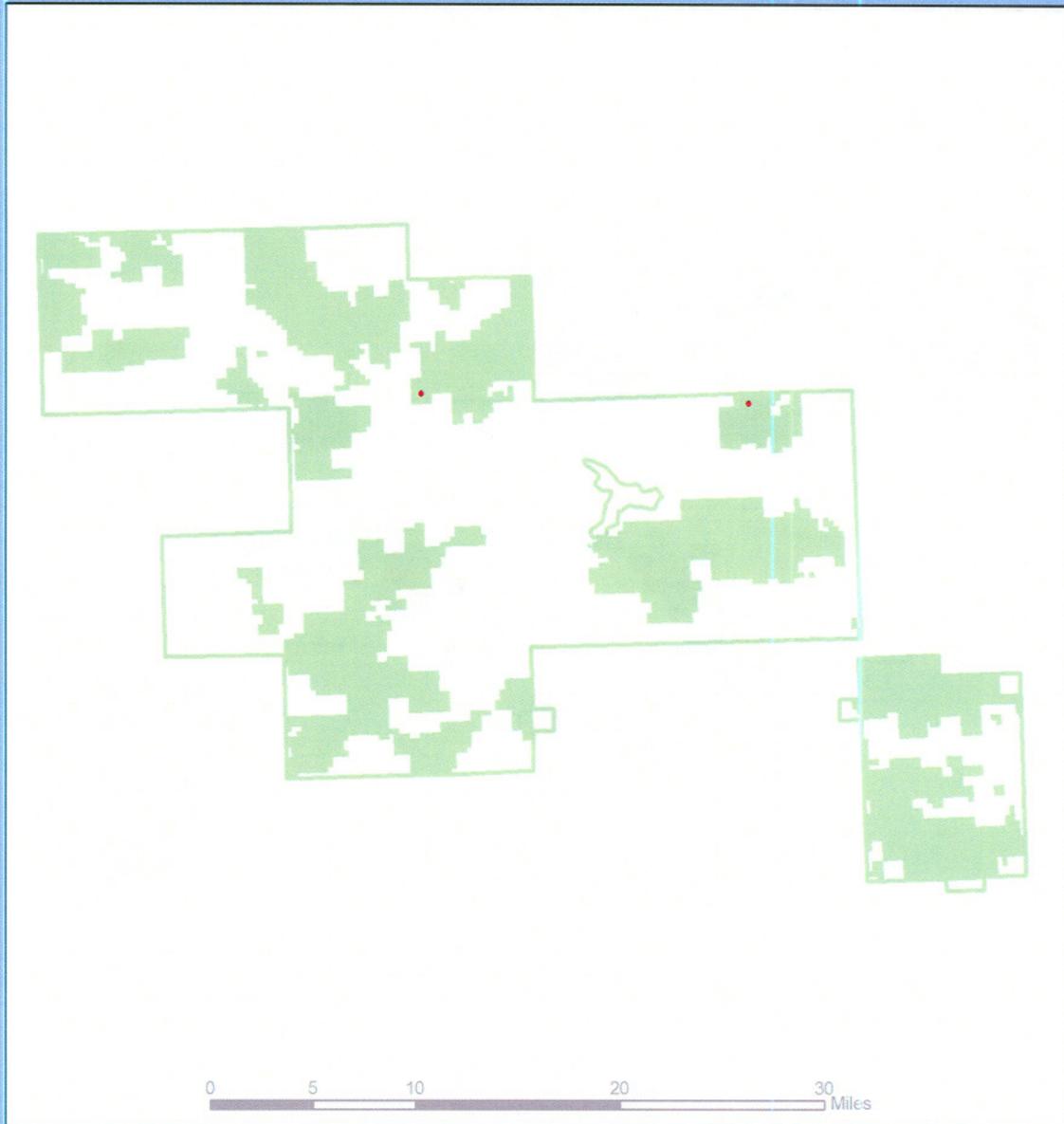
- 0.33
- 0.67 - 1.00
- 1.67

-  National Grassland
-  USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Marbled Godwit



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

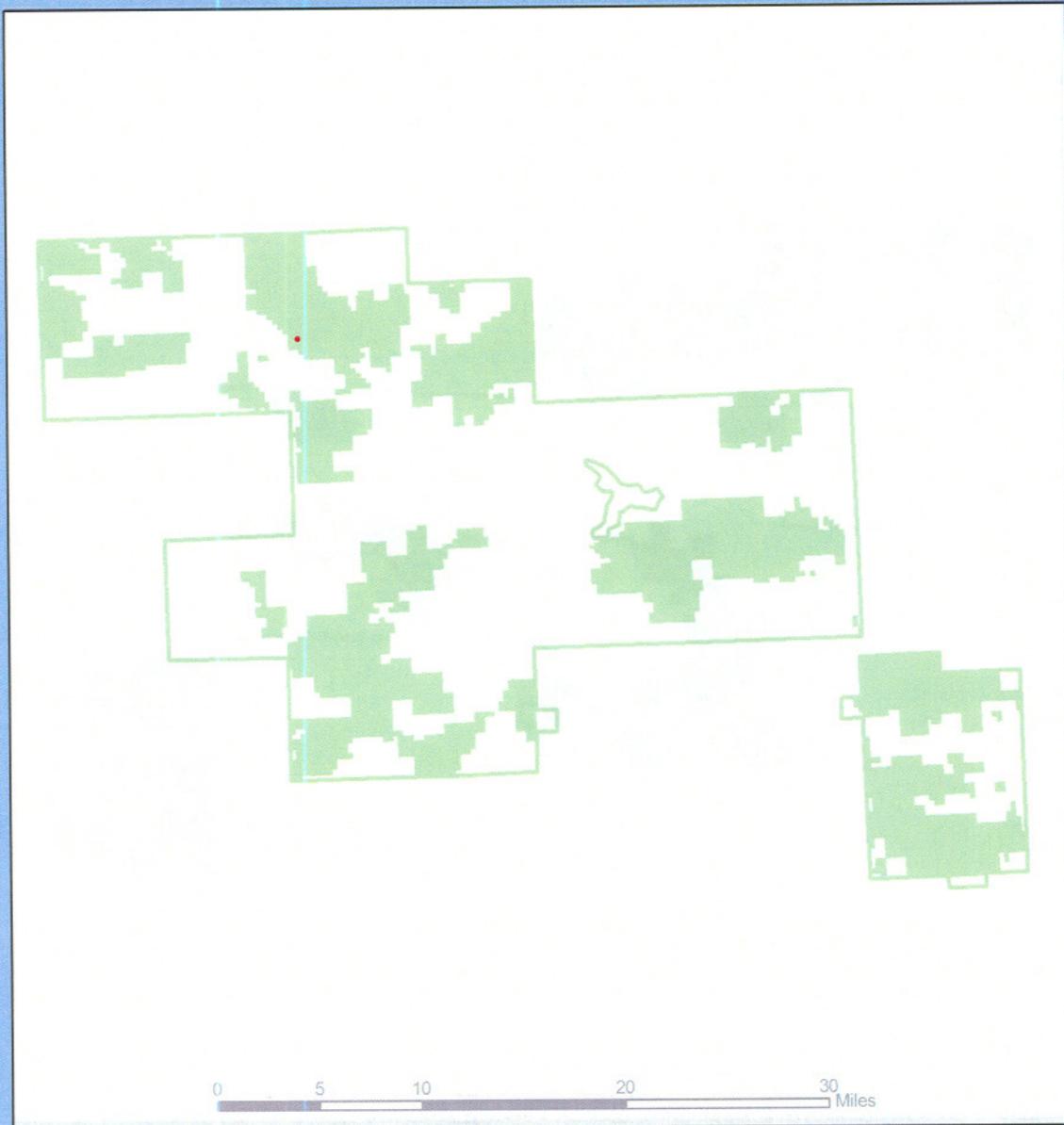
 National Grassland

 USFS Boundary



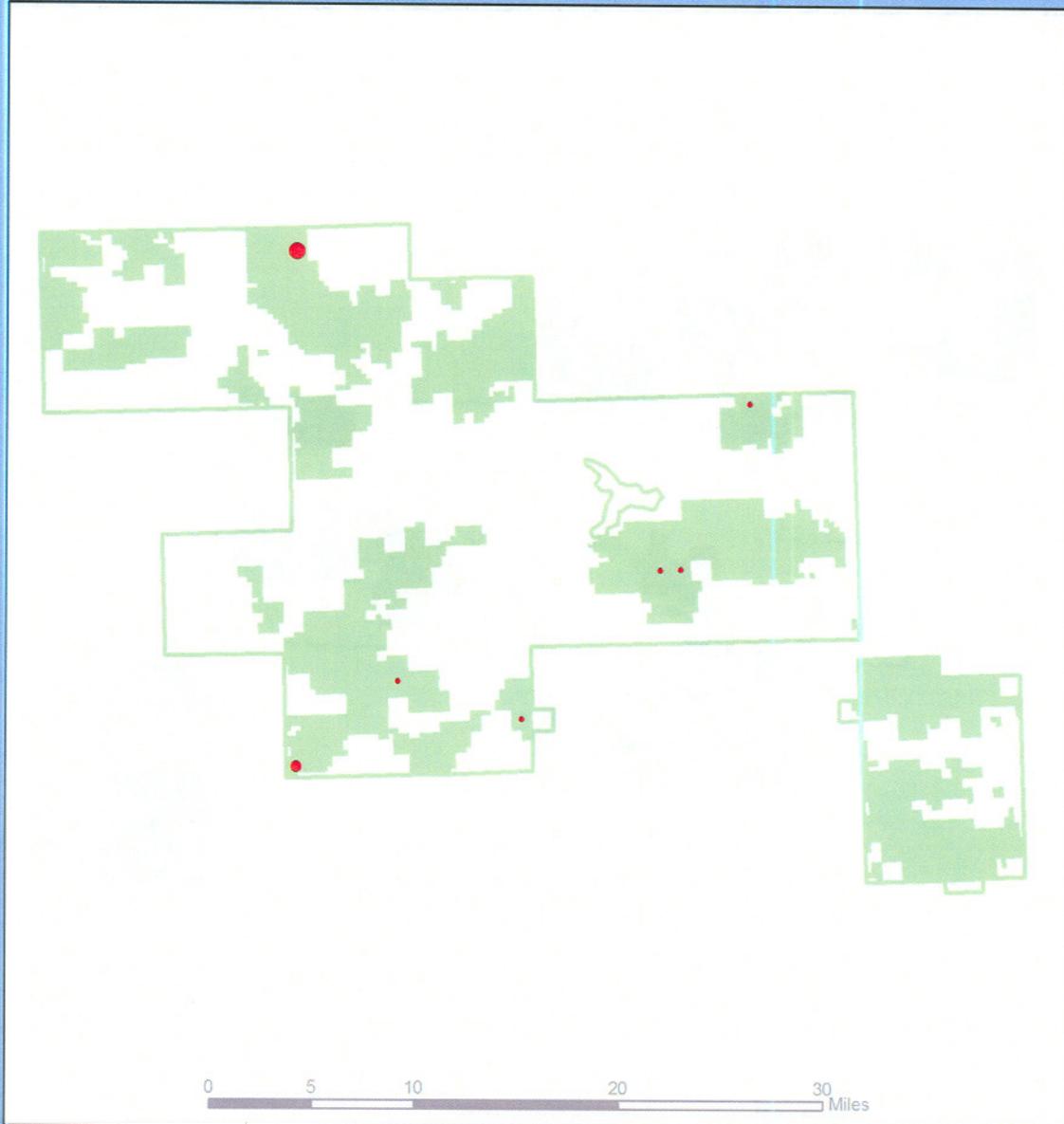
Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Short-eared Owl



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Mourning Dove



LEGEND

Index of Abundance (birds/section/effort)

- 0.33
- 0.67
- 1.00

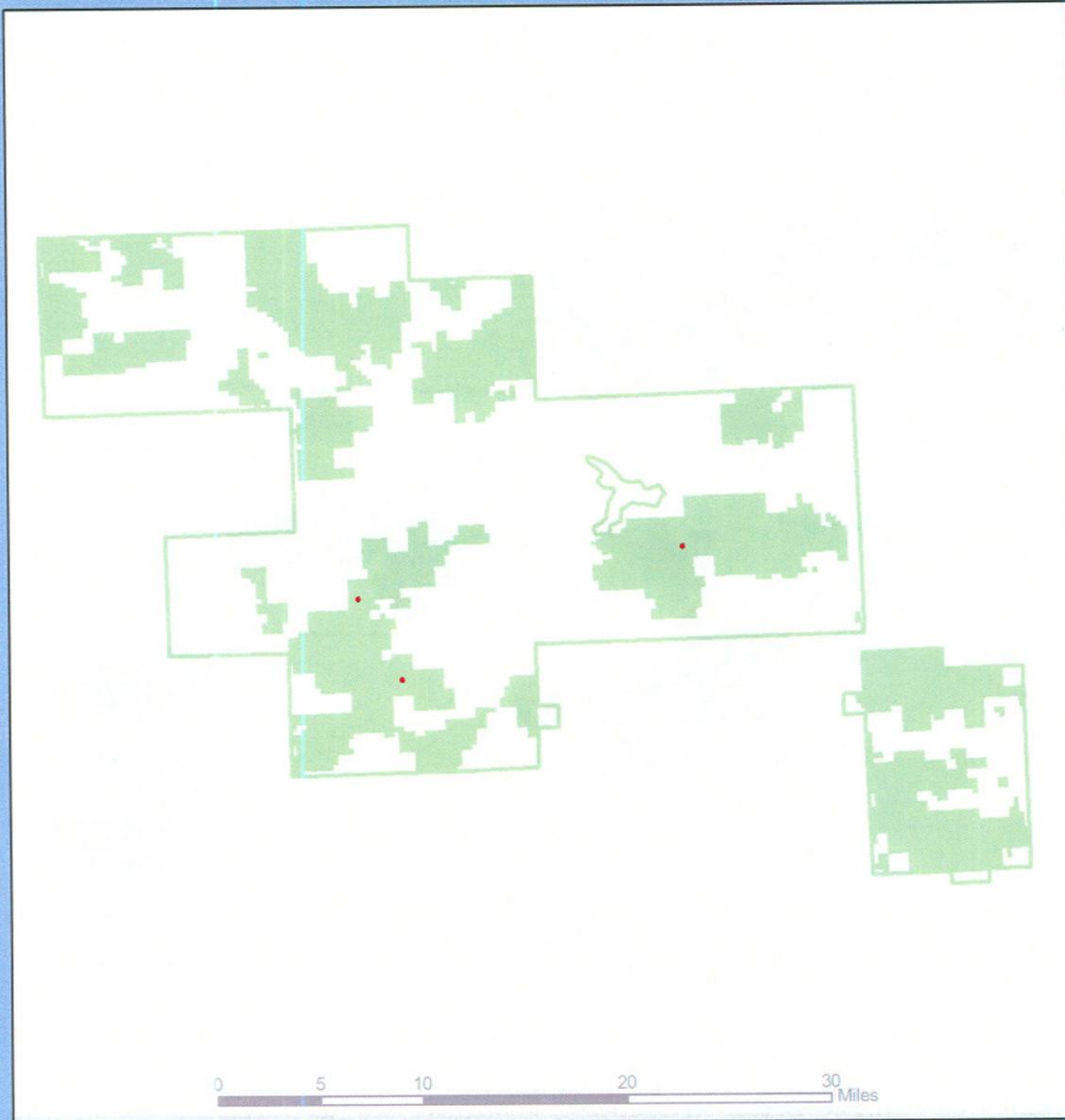
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Common Nighthawk



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

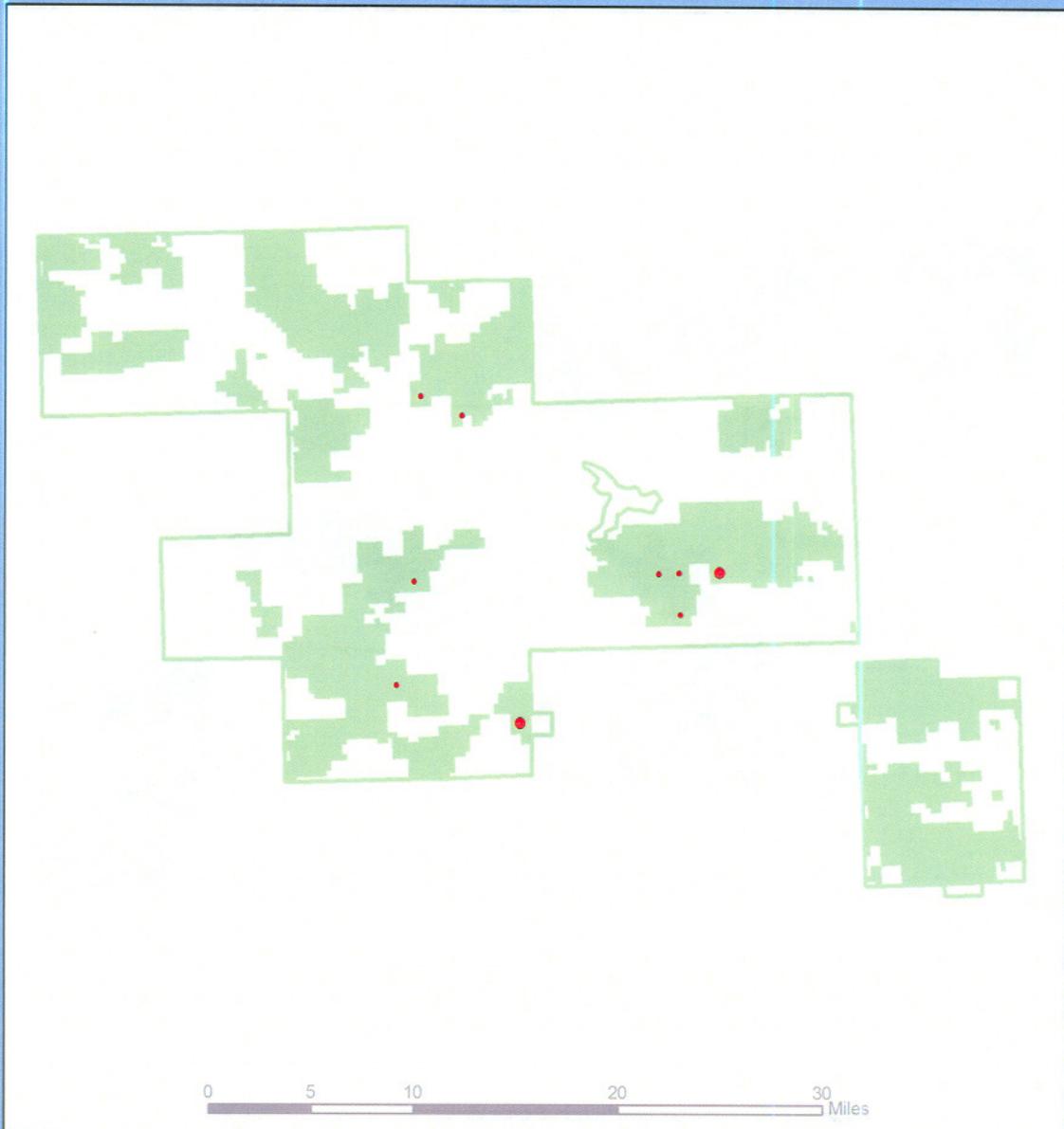
 National Grassland

 USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Western Kingbird



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

• 0.67

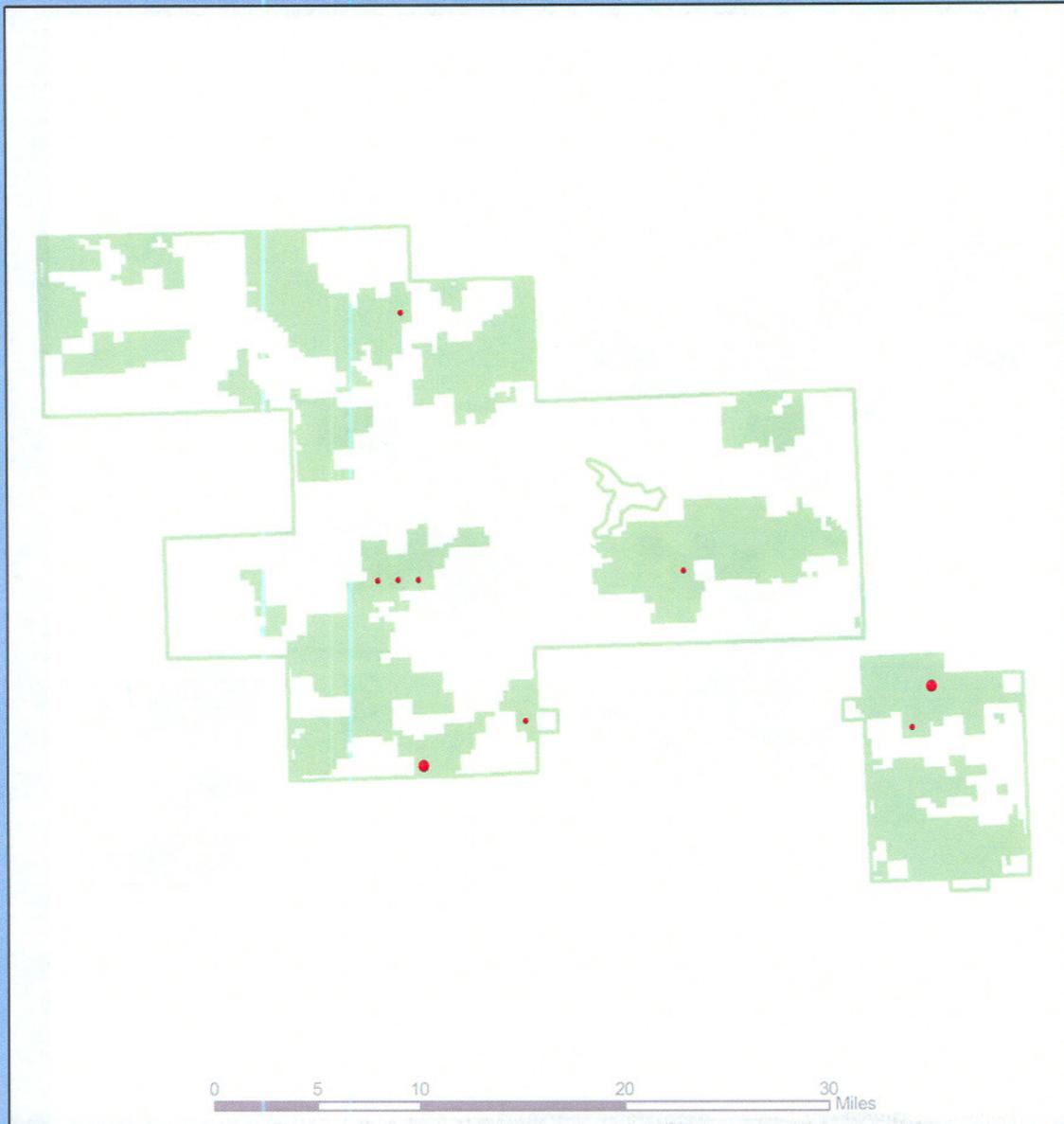
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Eastern Kingbird



LEGEND

Index of Abundance (birds/section/effort)

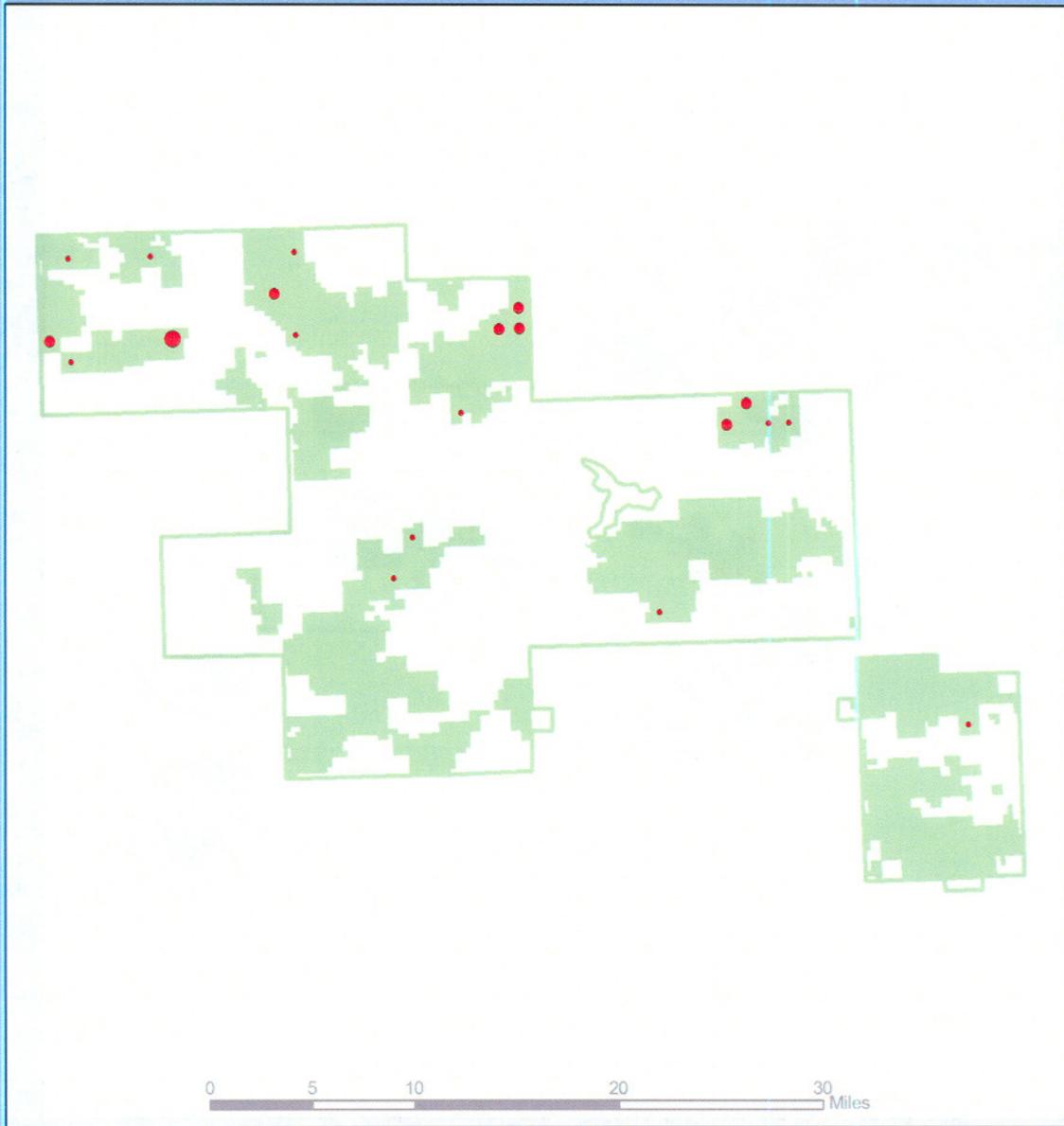
- 0.33
- 0.67

■ National Grassland
□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Horned Lark



LEGEND

Index of Abundance (birds/section/effort)

- 0.33
- 1.00 - 1.33
- 2.00

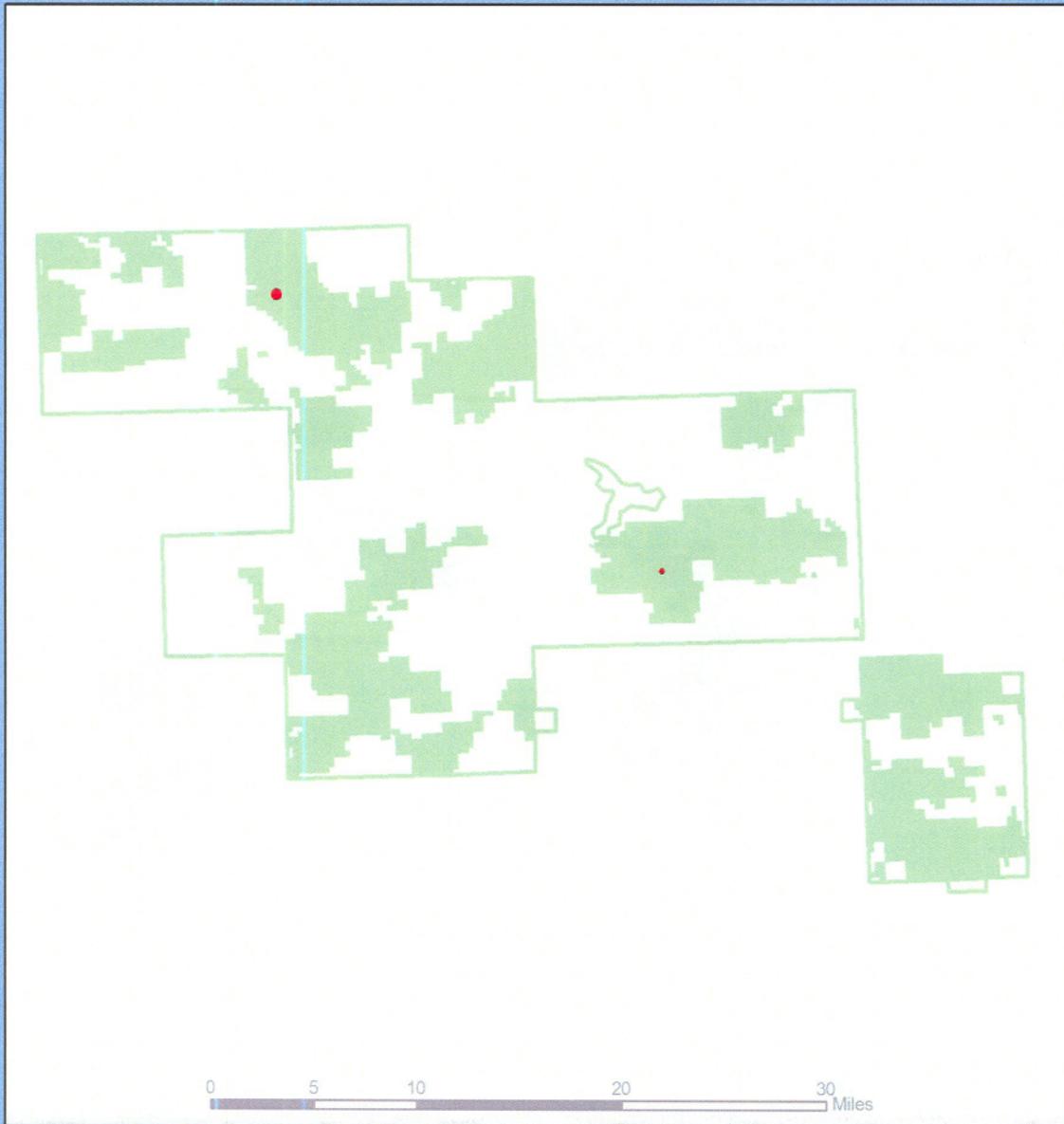
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Northern Rough-winged Swallow



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

• 0.67

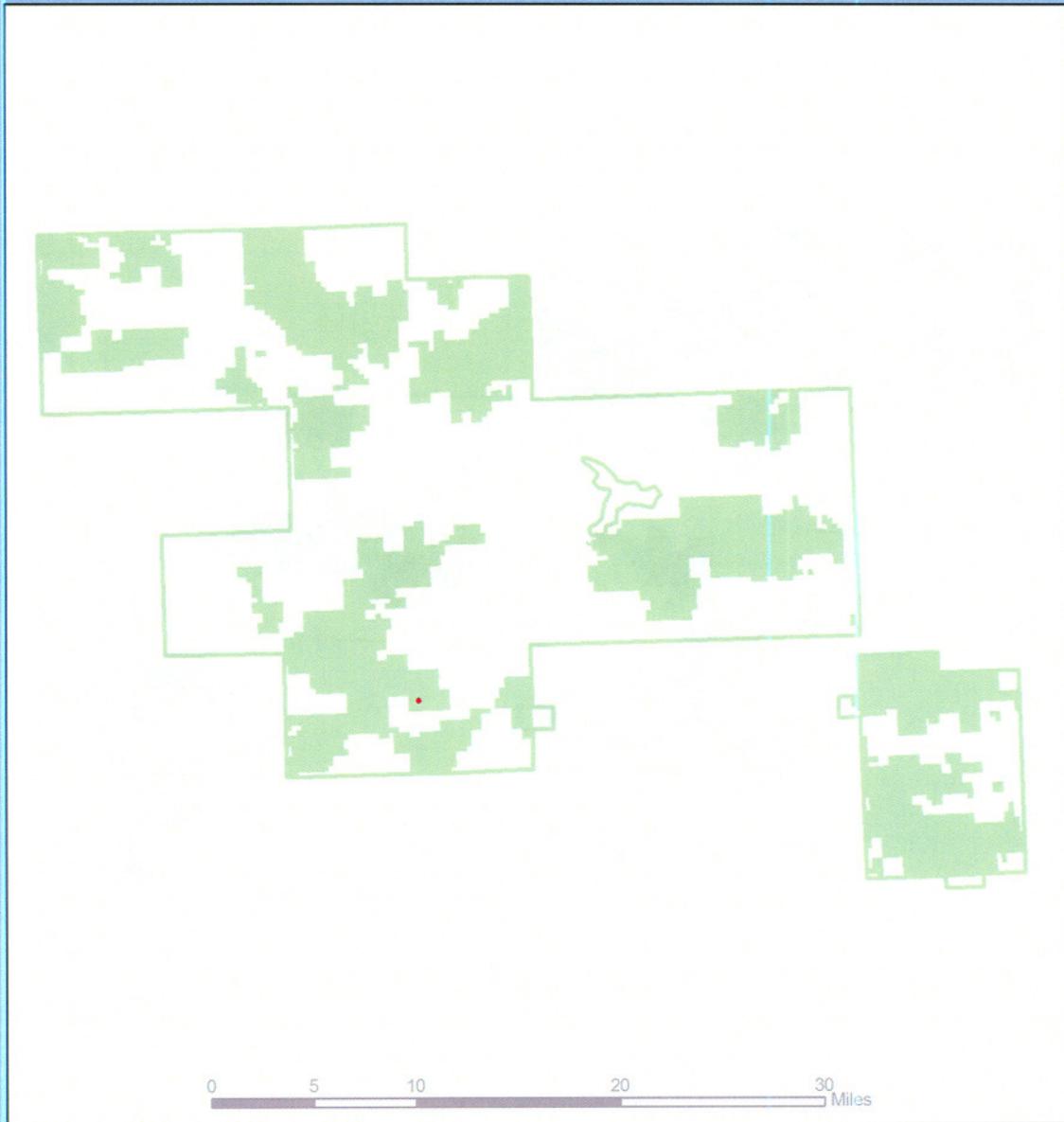
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Brown Thrasher



LEGEND

Index of Abundance (birds/section/effort)

• 0.67

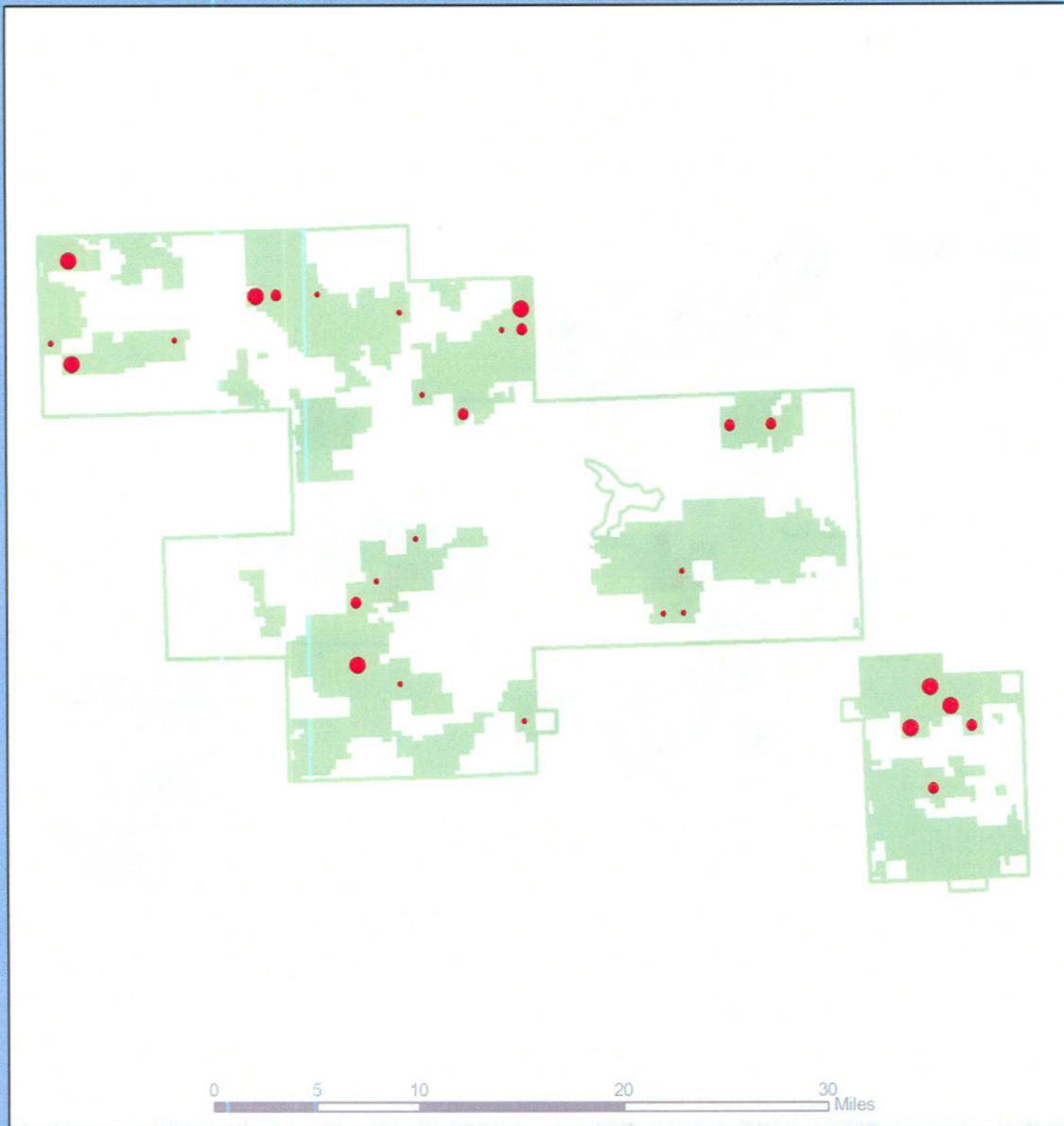
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Lark Bunting



LEGEND

Index of Abundance (birds/section/effort)

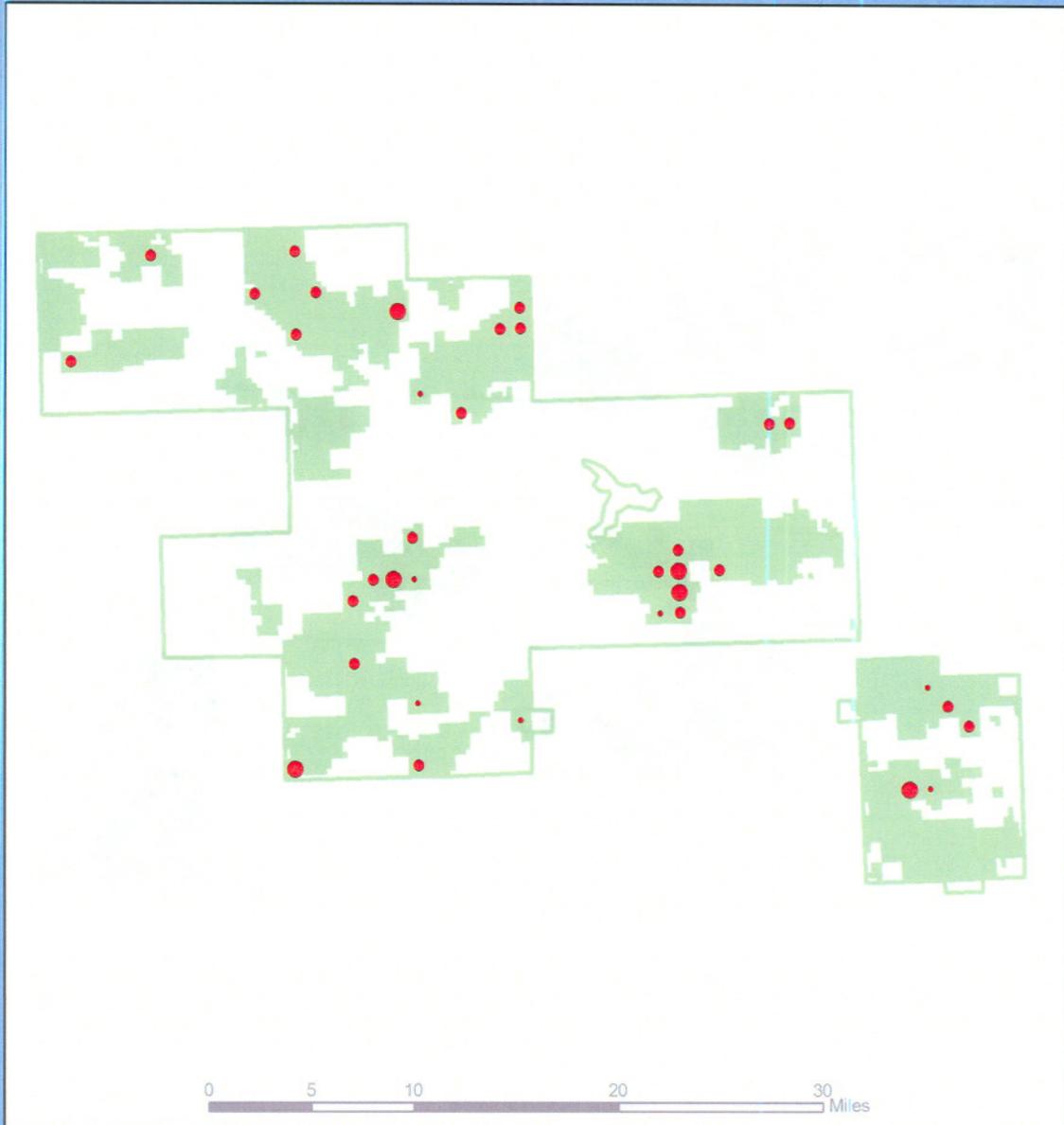
- 0.33 - 0.67
- 1.00 - 1.33
- 2.00 - 3.67

-  National Grassland
-  USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Grasshopper Sparrow



LEGEND

Index of Abundance (birds/section/effort)

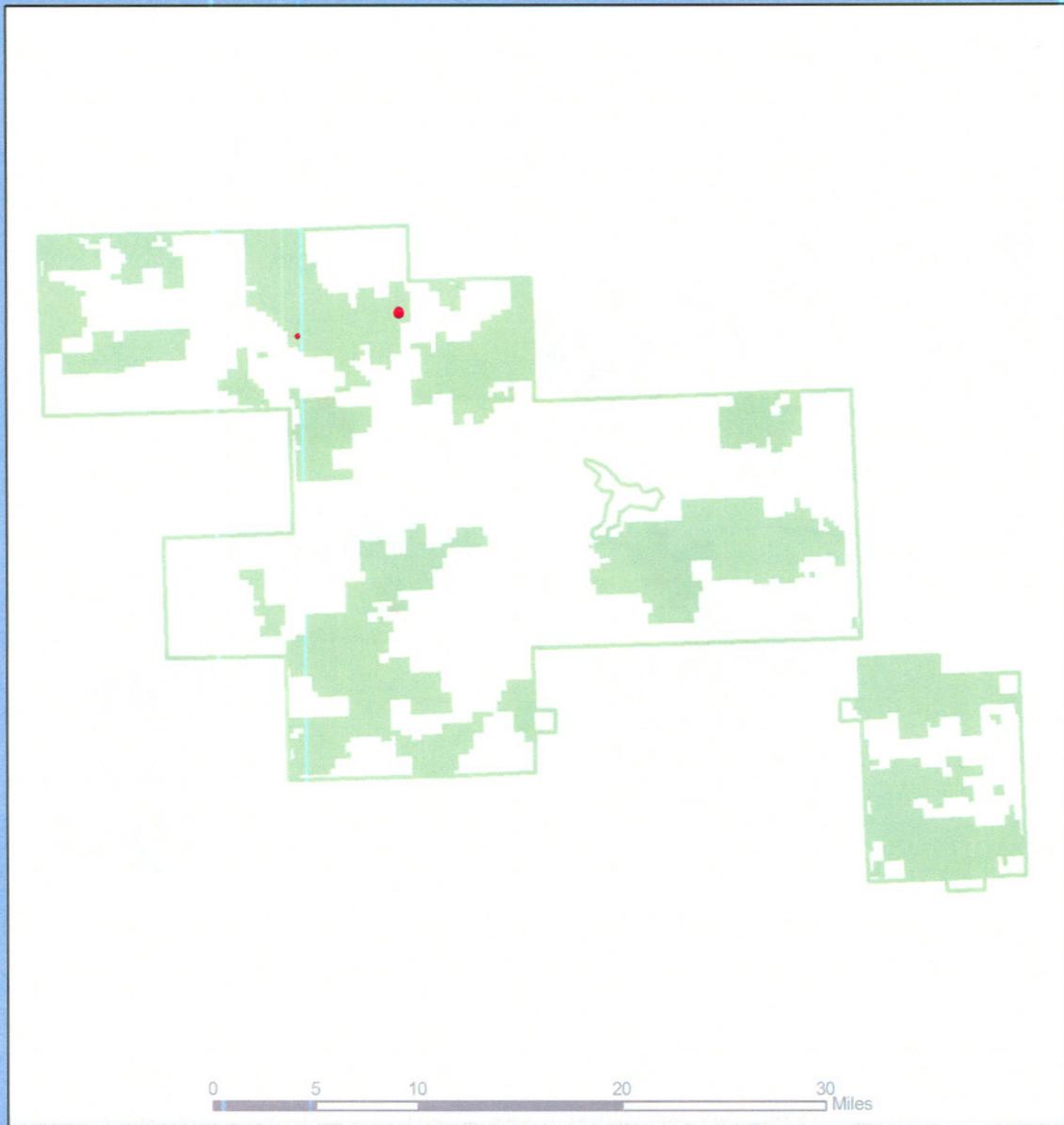
- 0.33
- 0.67 - 1.00
- 1.33 - 1.67

- National Grassland
- USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Baird's Sparrow



LEGEND

Index of Abundance (birds/section/effort)

- 0.33
- 1.00

■ National Grassland
□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Chestnut-collared Longspur



LEGEND

Index of Abundance (birds/section/effort)

- 0.33 - 1.00
- 1.33 - 2.00
- 2.33 - 3.00

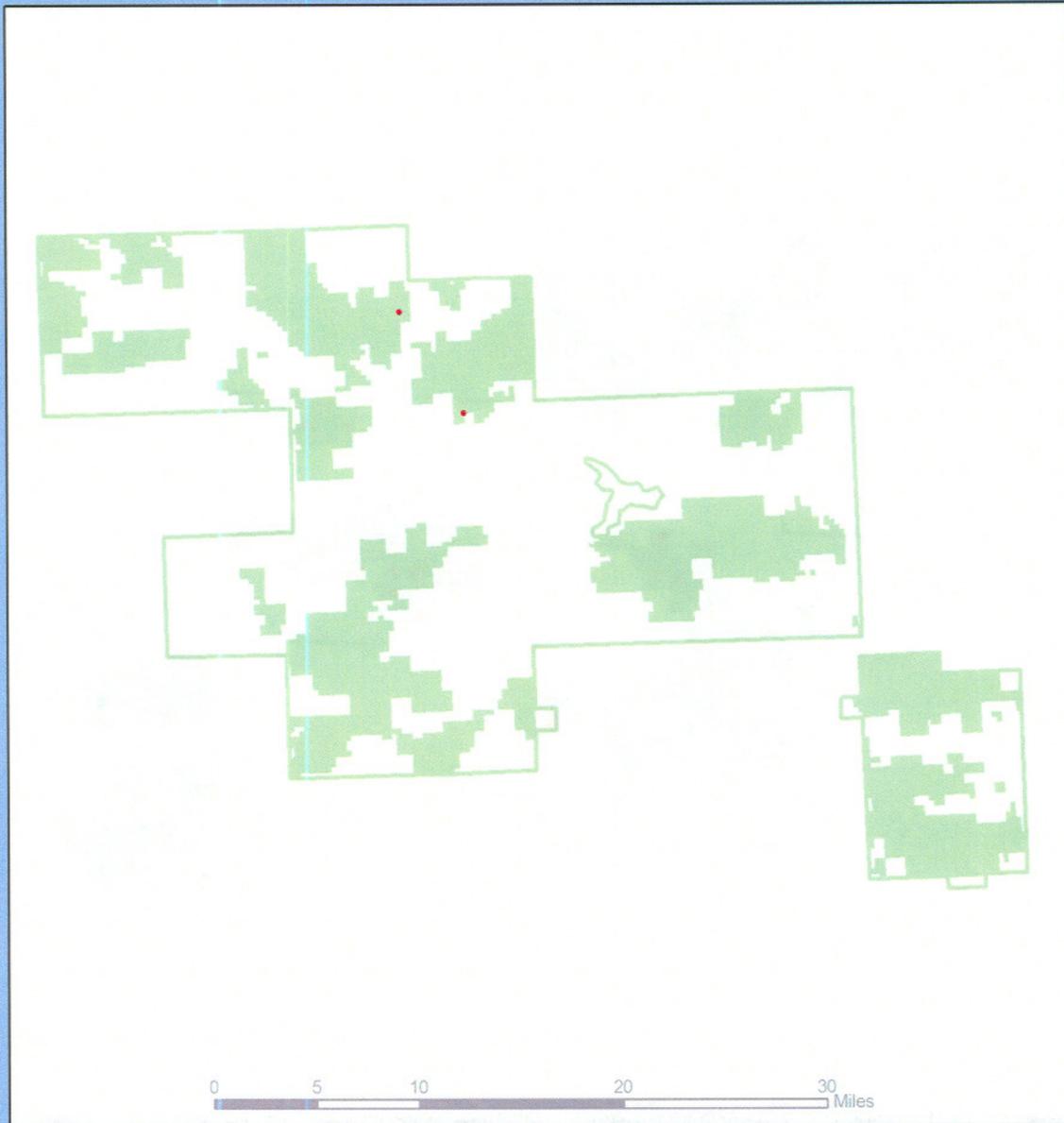
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Bobolink



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

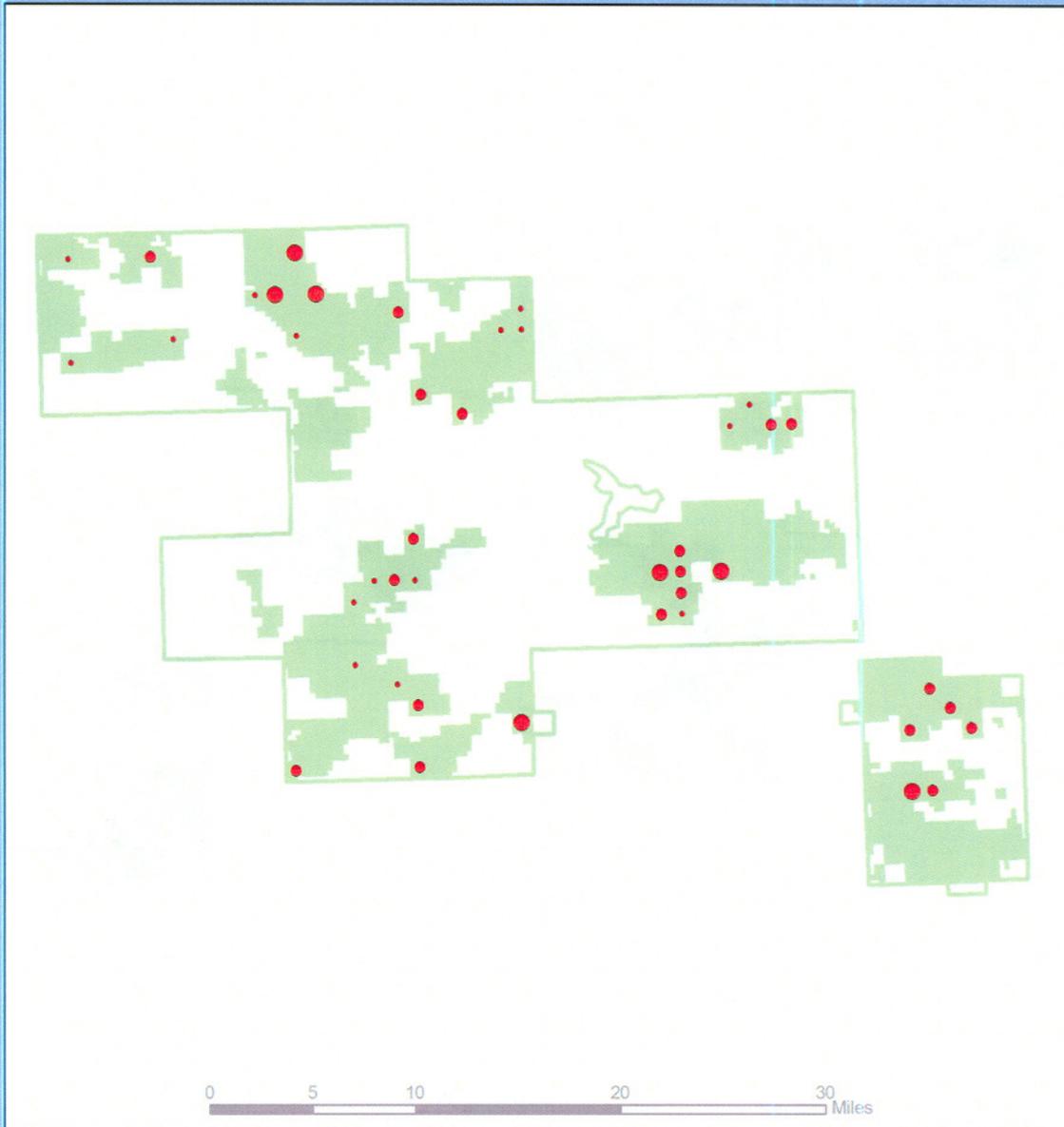
 National Grassland

 USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Western Meadowlark



LEGEND

Index of Abundance (birds/section/effort)

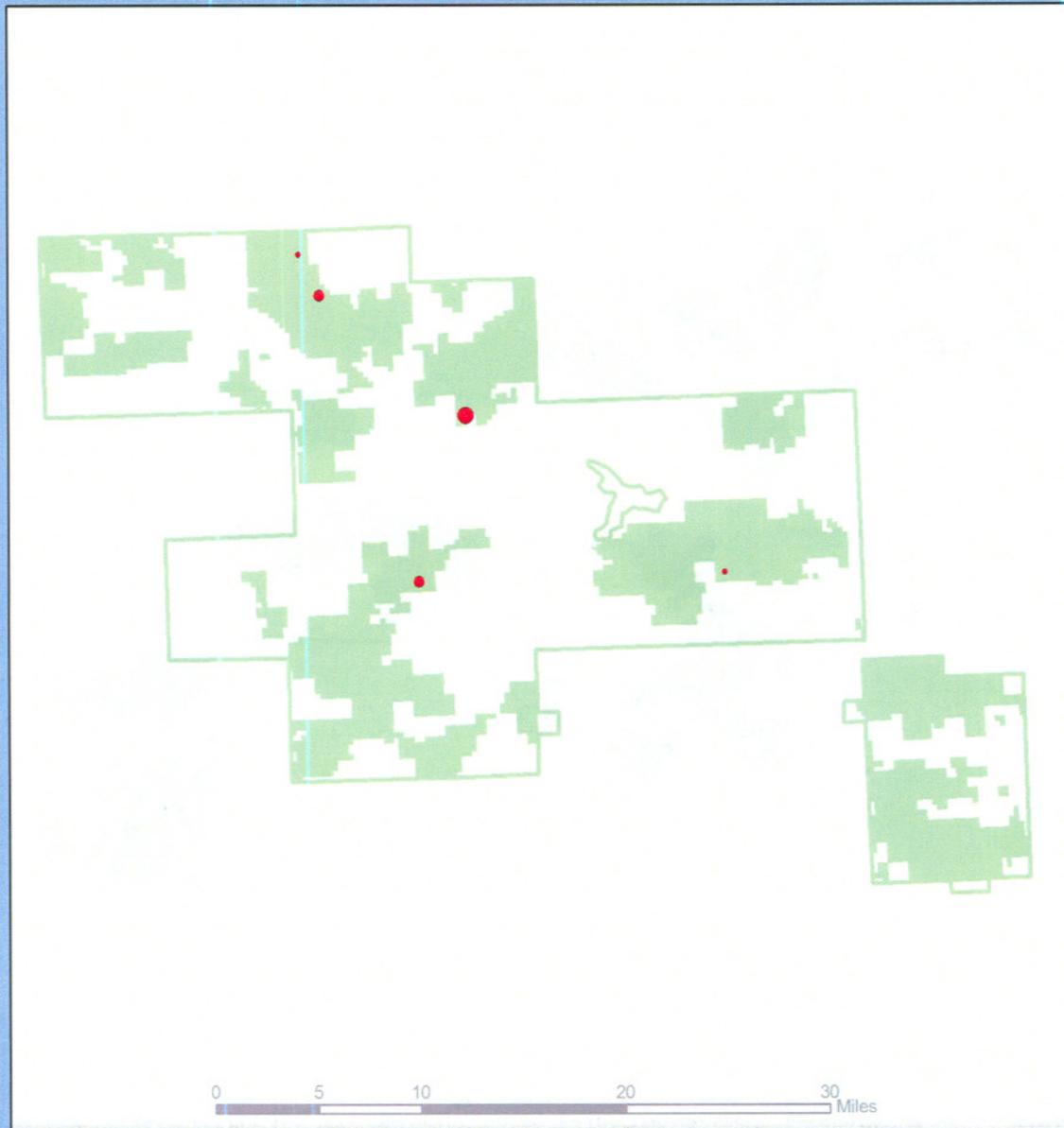
- 0.33 - 0.67
- 1.00 - 1.67
- 2.00 - 2.67

-  National Grassland
-  USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Red-winged Blackbird



LEGEND

Index of Abundance (birds/section/effort)

- 0.33
- 0.67
- 1.00

-  National Grassland
-  USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Yellow-headed Blackbird



LEGEND

Index of Abundance (birds/section/effort)

• 0.33

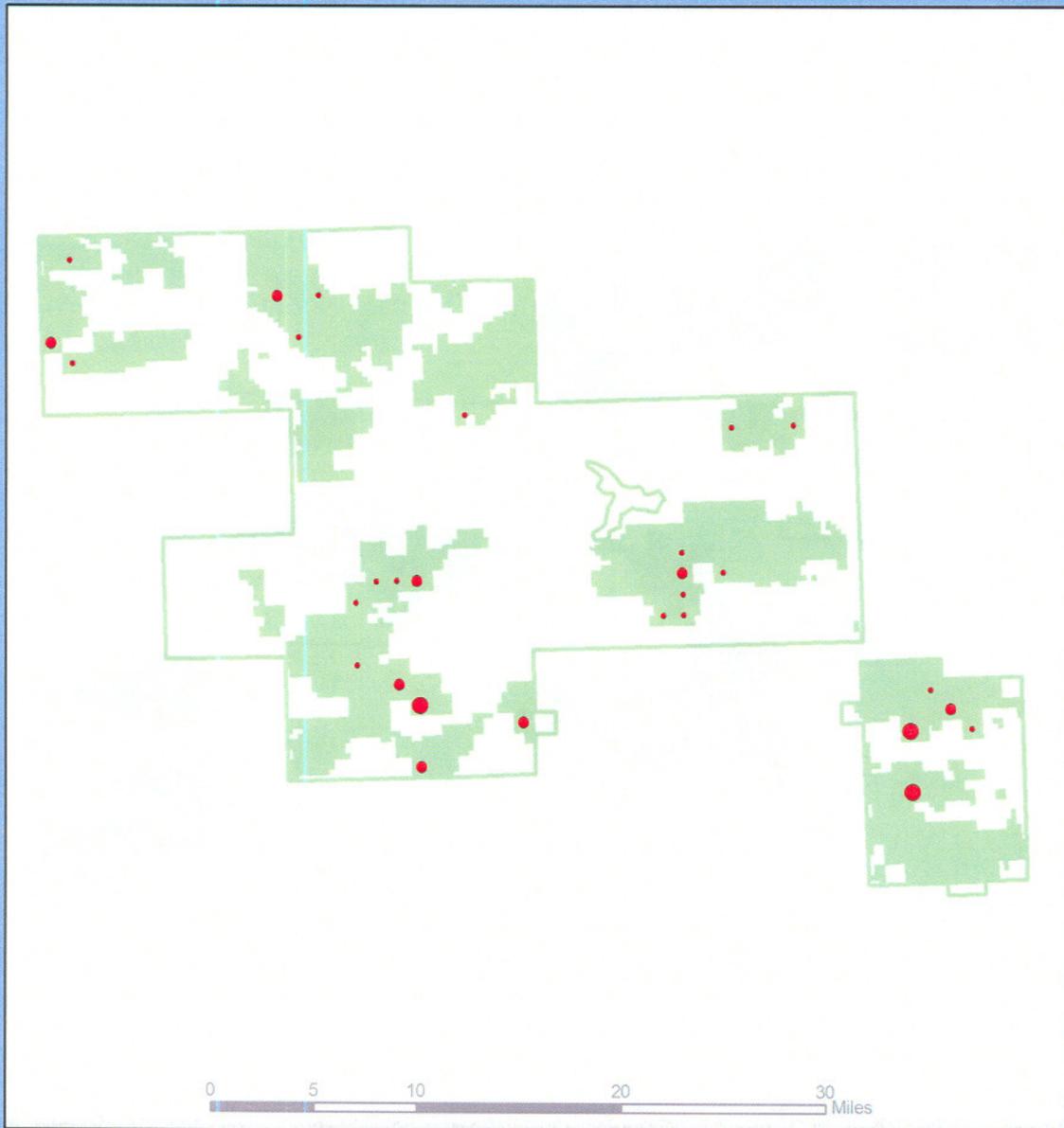
■ National Grassland

□ USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Brown-headed Cowbird



LEGEND

Index of Abundance (birds/section/effort)

- 0.33 - 0.67
- 1.00 - 1.67
- 2.00 - 2.67

- National Grassland
- USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

Orchard Oriole



LEGEND

Index of Abundance (birds/section/effort)

• 1.00

National Grassland

USFS Boundary



Distribution and index of abundance of the indicated species within Grand River National Grassland. Index of abundance is the number of birds observed in a 1-mi² section of land divided by the number of point counts conducted on that section.

APPENDIX B - Species List. A complete list of all species detected on Grand River National Grassland with number of detections (June 11 – June 14, 2004).

Common Name	Scientific Name	# of Detections
Gadwall	<i>Anas strepera</i>	1
American Wigeon	<i>Anas americana</i>	2
Mallard	<i>Anas platyrhynchos</i>	3
Blue-winged Teal	<i>Anas discors</i>	4
Ring-necked Pheasant	<i>Phasianus colchicus</i>	9
Northern Harrier	<i>Circus cyaneus</i>	8
Swainson's Hawk	<i>Buteo swainsoni</i>	6
Red-tailed Hawk	<i>Buteo jamaicensis</i>	1
Killdeer	<i>Charadrius vociferus</i>	4
Upland Sandpiper	<i>Bartramia longicauda</i>	28
Marbled Godwit	<i>Limosa fedoa</i>	2
Mourning Dove	<i>Zenaida macroura</i>	10
Short-eared Owl	<i>Asio flammeus</i>	1
Common Nighthawk	<i>Chordeiles minor</i>	3
Northern Flicker	<i>Colaptes auratus</i>	2
Western Kingbird	<i>Tyrannus verticalis</i>	11
Eastern Kingbird	<i>Tyrannus tyrannus</i>	11
Horned Lark	<i>Eremophila alpestris</i>	43
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	3
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	12
Barn Swallow	<i>Hirundo rustica</i>	4
Brown Thrasher	<i>Toxostoma rufum</i>	2
Sprague's Pipit	<i>Anthus spragueii</i>	11
Yellow Warbler	<i>Dendroica petechia</i>	1
Lark Bunting	<i>Calamospiza melanocorys</i>	105
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	90
Baird's Sparrow	<i>Ammodramus bairdii</i>	4
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	150
Bobolink	<i>Dolichonyx oryzivorus</i>	2
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	9
Western Meadowlark	<i>Sturnella neglecta</i>	150
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	1
Common Grackle	<i>Quiscalus quiscula</i>	1
Brown-headed Cowbird	<i>Molothrus ater</i>	75
Orchard Oriole	<i>Icterus spurius</i>	3

