

Monitoring of Grassland Birds on Little Missouri, Sheyenne and Grand River National Grasslands



Tony Leukering

May 2007

Robert Sparks and
David Hanni



Dan Svingen
North Dakota USDA
Forest Service



Rocky Mountain Bird Observatory

14500 Lark Bunting Lane

Brighton, CO 80603

303. 659-4348

Tech. Report # M-SS-DAKPG06-01

ROCKY MOUNTAIN BIRD OBSERVATORY

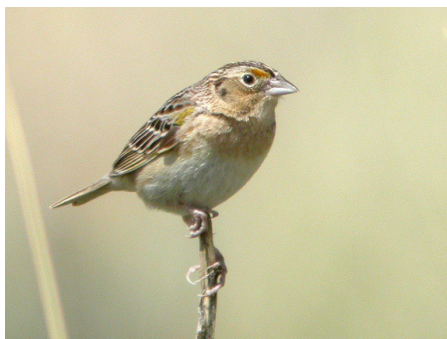
The mission of the Rocky Mountain Bird Observatory (RMBO) is the conservation of birds of the Rocky Mountains, Great Plains, and Intermountain West, and the habitats on which they depend. RMBO practices a multi-faceted approach to bird conservation that integrates scientific research and monitoring studies with education and outreach programs to bring bird conservation issues to the public and other conservation partners. RMBO works closely with state and federal natural resource agencies, private landowners, schools, and other nonprofit organizations. RMBO accomplishes its mission by working in four areas:

Research: *RMBO studies avian responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.*

Monitoring: *RMBO monitors the distribution and abundance of birds through long-term, broad-scale monitoring programs designed to track population trends for birds of the region.*

Education: *RMBO provides active, experiential, education programs for K-12 students in order to create an awareness and appreciation for birds, with a goal of their understanding of the need for bird conservation.*

Outreach: *RMBO shares the latest information in land management and bird conservation practices with private landowners, land managers, and resource professionals at natural resource agencies. RMBO develops voluntary, working partnerships with these individuals and groups for habitat conservation throughout the Great Plains and Rocky Mountains.*



Bill Schmoker

Suggested Citation:

Sparks, R.A., D. J. Hanni. 2006. Monitoring of Grassland Birds on Little Missouri, Sheyenne and Grand River National Grasslands 45 pp.

Contact information:

David Hanni: david.hanni@rmbo.org

Rob Sparks: rob.sparks@rmbo.org

RMBO

14500 Lark Bunting Lane

Brighton, CO 80603

303-659-4348

TABLE OF CONTENTS

Executive Summary 1

Introduction..... 2

Results..... 7

Discussion..... 8

Acknowledgements..... 9

Literature Cited 10

APPENDIX A - Species Distribution Maps 12

 Sharp-tailed Grouse 13

 Northern Harrier..... 14

 Ferruginous Hawk..... 15

 Killdeer 16

 Upland Sandpiper..... 17

 Marbled Godwit 18

 Mourning Dove..... 19

 Say’s Phoebe..... 20

 Eastern Kingbird 21

 Horned Lark 22

 Mountain Bluebird 23

 Sprague’s Pipit 24

 Yellow Warbler..... 25

 Spotted Towhee 26

 Clay-colored Sparrow 27

 Vesper Sparrow..... 28

 Lark Bunting..... 29

 Grasshopper Sparrow 30

 Baird’s Sparrow 31

 Le Conte’s Sparrow 32

 Chestnut-collared Longspur..... 33

 Dickcissel..... 34

 Bobolink..... 35

 Red-winged Blackbird 36

 Western Meadowlark 37

 Yellow-headed Blackbird 38

 Brown-headed Co 39

APPENDIX B - Species List. 40

LIST OF FIGURES

Figure 1. Study Area	3
Figure 2. Monitoring blocks and transect locations.....	5

Executive Summary

Monitoring grassland birds is a valuable tool for effective management planning. The Forest Service and Rocky Mountain Bird Observatory (RMBO) recognized the need to monitor breeding bird populations in the Dakota grasslands, specifically on the Little Missouri, Sheyenne and 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 these National Grasslands, and 2) to compare these population trends with grouse lek counts within the same study area.

In 2004, we conducted thirty point transects, in 2005 we conducted 24 point transects and in 2006 we conducted thirty four transects on Little Missouri, Sheyenne and Grand River National Grasslands using a point transect survey method developed by RMBO (Leukering 2000). Following this method, point transects were carried out on 17 blocks located on these national grasslands. Monitoring National Grasslands in the Dakotas will provide density estimates for at least thirty two bird species and abundance data for 130 bird species. This report presents initial results and describes the goals and methodology of this bird monitoring program.

There is little information regarding bird species distributions and density estimates within these National Grasslands highlighting the importance of developing monitoring programs with the aim to understand population trends and underlying factors contributing to such trends. Monitoring National Grassland bird populations is a conservation need, which will help direct management actions for the preservation of bird populations and their ecosystem.

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). There is little doubt that the main bodies of North American prairie are among the continent's most endangered ecosystems (Sampson et al. 2004). Historically ecological drivers on the Great Plains included drought at the broad scale and grazing and fire at the landscape and local scales (Fuhlendorf and Engle 2001). Partners in Flight (PIF) found that 41% of upland breeding grassland bird species are declining and 30% lack enough data to assess population trends and stability in Bird Conservation Region (BCR) 11, in BCR 17, 38% of upland breeding grassland bird species are declining and 31% lack enough data to assess population trends and stability (Partners in Flight Species Assessment Database 2004). Little Missouri National Grassland and Grand River National Grassland fall in BCR 17 (Badlands and Prairies) and Sheyenne National Grassland falls in BCR 11 (Prairie Potholes) as designated by North American Bird Conservation Initiative.

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.

Consequently there are social and economic benefits with sustaining bird populations since observing birds is an increasing popular activity. United States Fish and Wildlife Service reported 46 million birdwatchers in America spent more than \$32 billion on birding and related activities (USFWS 2003).

In 2004, RMBO and the Forest Service initiated this study in response to the need for more comprehensive population trends and distributions for breeding birds and to compare Sharp-tailed Grouse counts with the monitoring data within the Dakota Grasslands (Figure 1). We will present density estimates in the next report for all years.

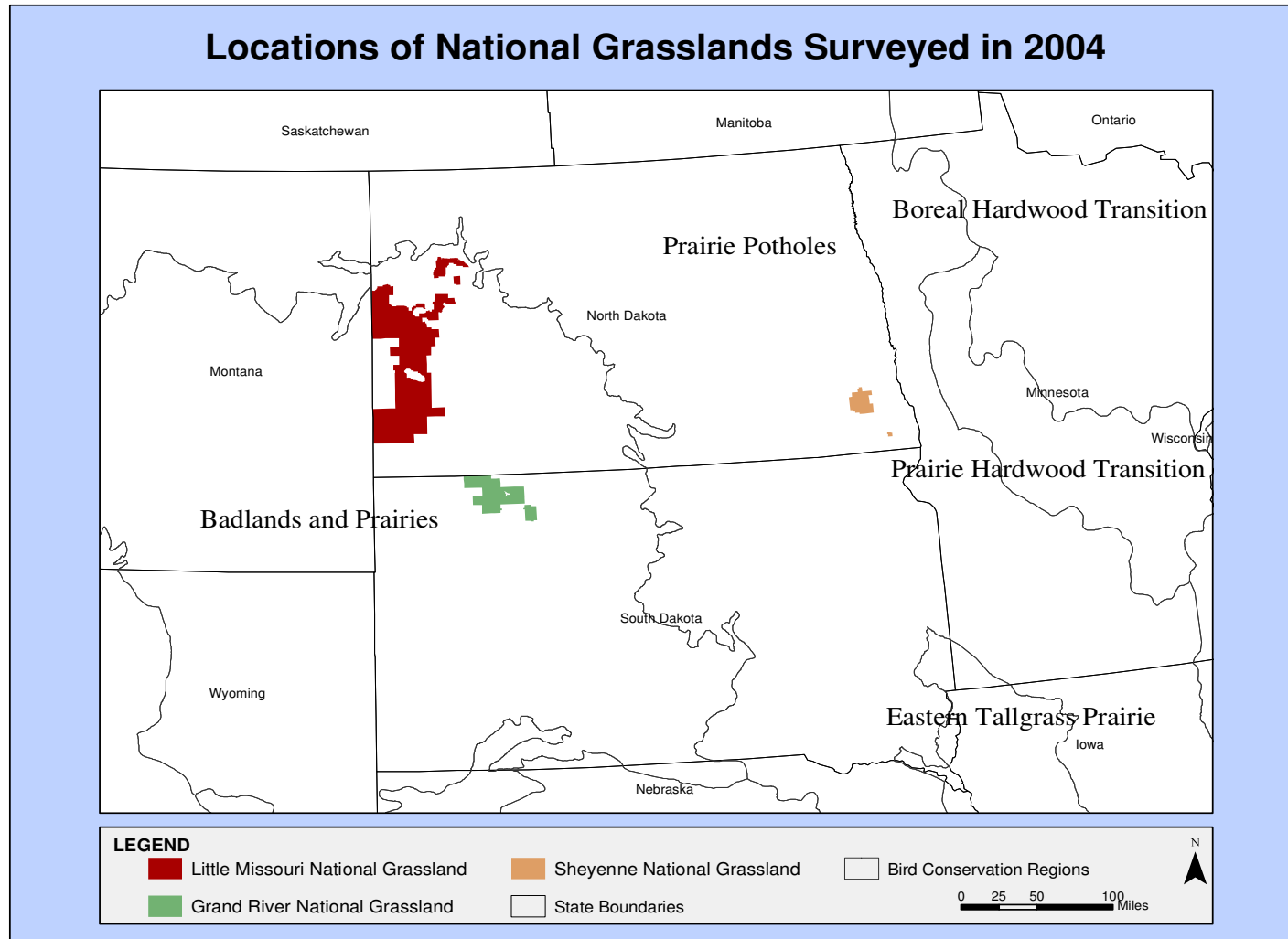


Figure 1. Study Area.

Methodology

Data was collected on three National Grasslands, Little Missouri, Sheyenne and Grand River on June 4 - 15, 2004 and June 5 – 12, 2005, June 18 – July 10, 2006. These dates correspond to the period of peak detectability for most breeding birds in each National Grassland. Experienced field biologists trained in bird identification and point transect methodology conducted all field work.

Section Selection

North Dakota State University and Dakota Parks and Game have cooperatively designed a grouse-survey protocol. Under this protocol, they will annually conduct lek surveys within 17 randomly chosen blocks. In spring 2003 the Forest Service investigated approximately 24 randomly chosen blocks, and selected the 17 blocks that best met design criteria (such as containing a minimum number of leks, minimum road access network, etc.). The total acreage of all 17 blocks is 136,960 acres. Two point transects were established in each of these seventeen blocks. (Figure 2). Due to a road closure one block in Little Missouri was not surveyed and due to bad weather two point transects were not conducted, one in Little Missouri National Grassland and Sheyenne National Grassland. Two transects were placed in each block with each transect starting point established systematically with a random bearing within the designated blocks.

Point Transect Protocol

RMBO surveyed bird populations in each block selected for monitoring using the point transect method (Buckland et al. 1993). Each transect was surveyed by one observer following protocol established by Leukering (2000). On the morning of the survey, the observer began the point transect at the first count station and then continued along the pre-selected bearing for all remaining points if possible. Observers conducted up to eight five-minute point counts at stations located at 250 meter intervals along each point transect, recording all bird detections on standardized forms.

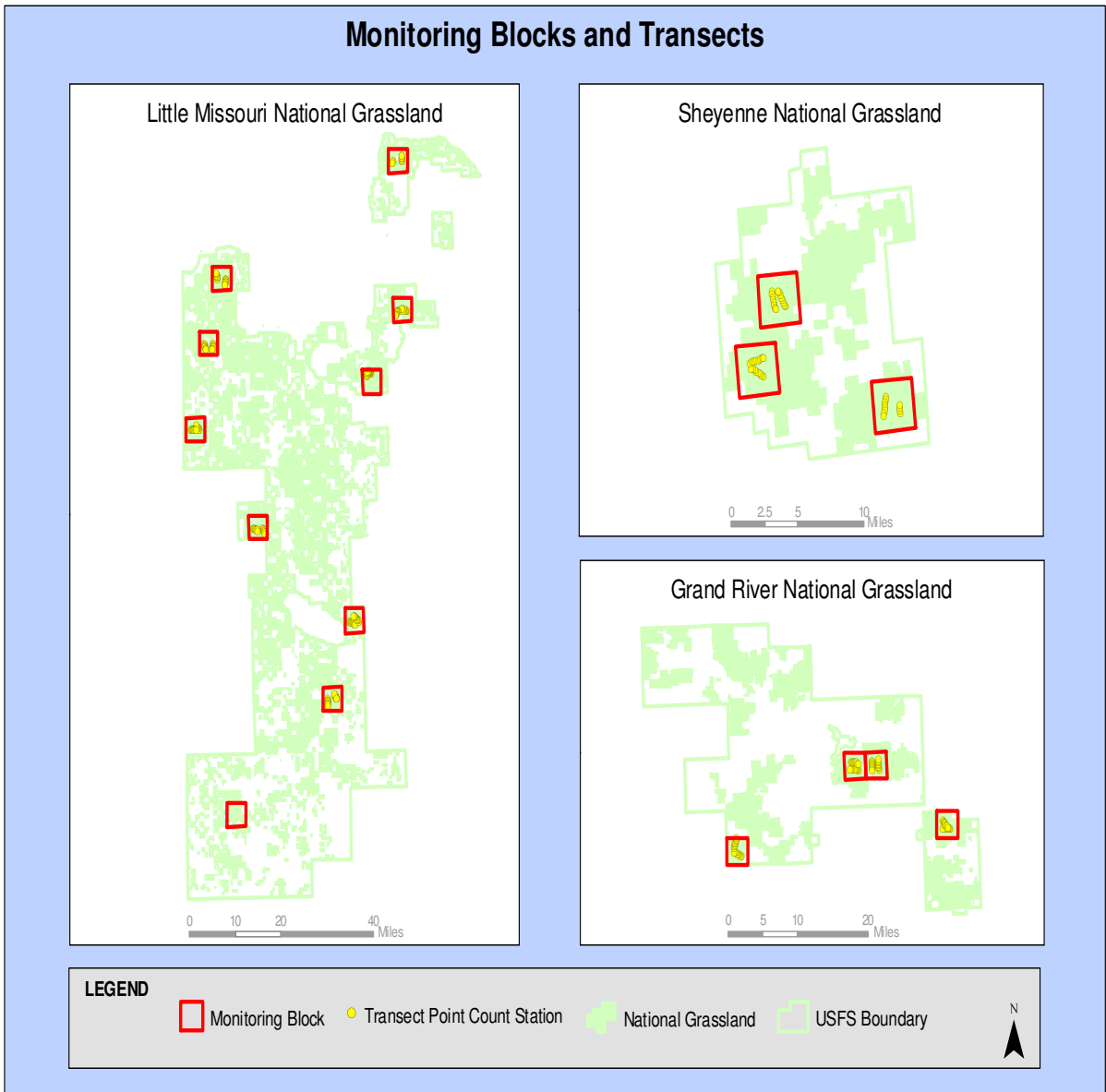


Figure 2. Monitoring blocks and transect locations.

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.

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 50- m radius of each point count. Vegetation data collected included the percent coverage and types of shrubs and percent coverage and height of ground cover. Nests of any raptors were documented with both GPS units and on maps.

Data Analysis

Program DISTANCE version 5.0 (Thomas 1998-99) will be 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) will be 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 DISTANCE analysis, a unique detection function is fit to each distribution of distances associated with a species in a given habitat. Because the detection function is unique to each species in each habitat, DISTANCE analysis avoids some serious problems inherent in traditional analyses of point count data (e.g., unquantifiable differences in detectability among habitats, species, and years). The three models that will be used to find the most appropriate detection function is Half-normal Cosine, Hazard-rate Simple Polynomial and Hazard-rate Cosine . 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.

The index of relative abundance used in the distribution maps are represented by graded map symbols, defined as the total number of individuals for each species detected on the transect divided by the number of point counts conducted on that transect (Appendix A).

Results

We conducted 30 point transects in 2004, 33 transects in 2005 and 34 transects in 2006 in Little Missouri, Sheyenne and Grand River National Grasslands. We observed 130 species overall; 93 in 2004, 102 in 2005 and 91 in 2006. We should be able to calculate density estimates for thirty two species using a global detection function to estimate density per year. Appendix A presents species distribution and relative abundance index for 2004. Appendix B presents species observed and number of detections for all years.

Discussion

Monitoring National Grasslands in the Dakotas will provide density estimates for at least thirty two bird species and abundance data for 130 bird species. Density estimates will describe population trends over time and the abundance data will characterize bird distribution on these National Grasslands over time. This data can be used to address management actions needed to sustain healthy bird populations and ecosystem integrity.

According to the North American Landbird Conservation Plan (Rich et al. 2004), four species we will be able to calculate density estimates for – Baird’s Sparrow, Sprague’s Pipit, Lark Bunting, and Grasshopper Sparrow - are species of Continental Importance within the Prairie Avifaunal Biome. One species- Mountain Bluebird- is considered a species of Continental Importance within the Intermountain West Avifaunal Biome.

Baird’s Sparrow is in the immediate action category while Lark Bunting, Grasshopper Sparrow, and Sprague’s Pipit are in the management action category in need of on the ground conservation actions to reverse significant, long-term population declines or sustain vulnerable populations. Mountain Bluebird is placed in the long-term planning and responsibility action category indicating the need for long-term planning to maintain a sustainable population. Lark Bunting, Mountain Bluebird, and Grasshopper Sparrow are also listed as stewardship species; hence they are representative of their biome and are intended to represent bird characteristics and habitat within their biome. This plan was developed by Partners in Flight and serves as a blueprint for continental habitat conservation under the North American Bird Conservation Initiative (Rich et al. 2004).

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 foster historic grassland conditions.

Monitoring at a local scale will result in more informed land management decisions regarding conservation of grassland birds and their habitat. Correlations can 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 the Dakota grasslands.

Overall, point transect 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. Point transect 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 the Dakota Grasslands.

Acknowledgements

We thank the U.S Forest Service for funding the project in particular Dan Svingen and to RMBO staff for review of the document and especially the field crew that collected the data.

Literature Cited

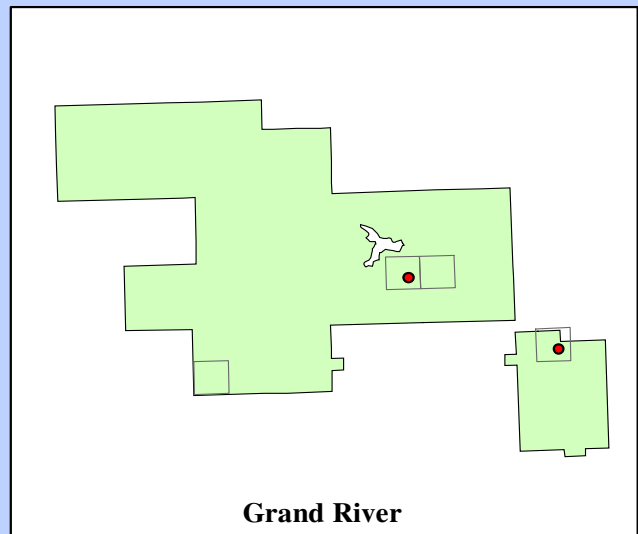
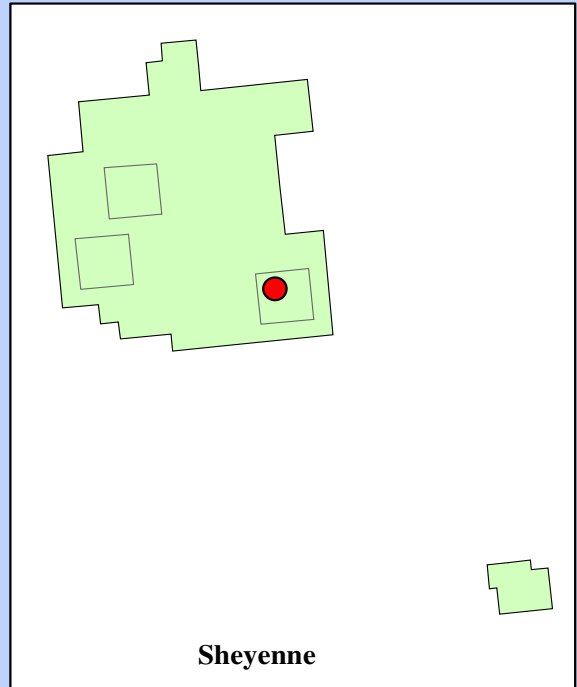
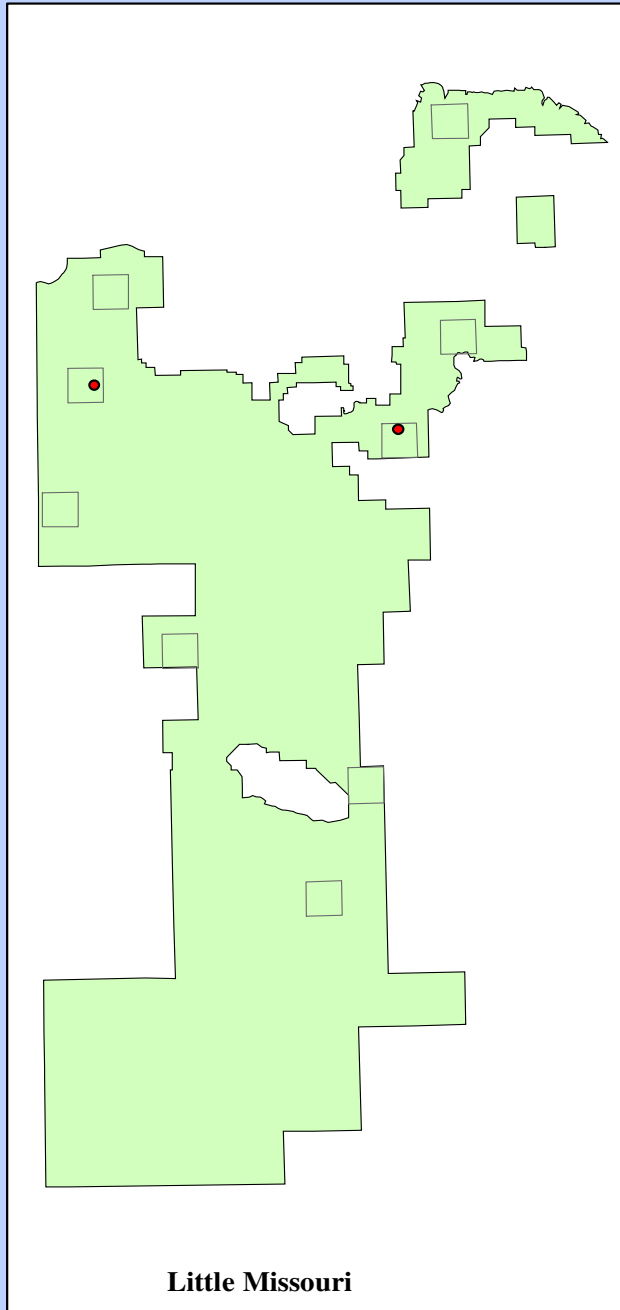
- Buckland, S.T., D.R. Anderson, K.P. Burnham, and J.L. Laake. 1993. Distance Sampling: Estimating Abundance of Biological Populations. Chapman and Hall, London, reprinted 1999 by RUWPA, University of St. Andrews, Scotland. 446pp.
- Leukering, T. 2000. Point transect protocol for Monitoring Colorado's Birds. Rocky Mountain Bird Observatory, Brighton, CO. 16pp.
- Leukering, T., M.F. Carter, A. Panjabi, D. Faulkner, and R. Levad. 2000. Monitoring Colorado's Birds: The Plan for Count-based Monitoring.
- Partners in Flight Database. 2004. <http://www.rmbo.org/pif/pifdb.html>
- Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D.W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Inigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY. pgs.1,27,60.
- Robbins, C.S., J.R. Souer, R.S. Greenburg, and S. Droege. 1989. Population declines in North American birds that migrate to the Neotropics. Proc. Natl. Acad. Sci., USA 86:7658-7662.
- Robbins, C.S., J.R. Sauer, and B.G. Peterjohn. 1993. Population trends and management opportunities for Neotropical migrants. In Finch, D.M. and P.W. Stangel (eds.) Status and Management of Neotropical Migratory Birds; 1992 Sept. 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229. Fort Collins, CO. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 422 pp.
- Sampson, F.B., F.L. Knopf, and W.R. Ostlie. 2004. Wildlife Society Bulletin. 32(1):6-15.
- Sampson, F. and Knopf, F., eds. 1996. Prairie Conservation. Island Press. Washington D.C. Sauer, J.R. 1993. Monitoring Goals and Programs of the U.S. Fish and Wildlife Service. In Finch, D.M. and P.W. Stangel (eds.) Status and Management of Neotropical Migratory Birds; 1992 Sept. 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229. Fort Collins, CO. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 422 pp.
- Sauer, J.R. 2000. Combining information from monitoring programs: complications associated with indices and geographic scale. In R. Bonney et al. (eds.), Strategies
- Monitoring Dakota Grassland Birds 10

- for Bird Conservation: The Partners in Flight Planning Process. Proceedings of the 3rd Partners In Flight Workshop; 1995 Oct. 1-5, Cape May, NJ. USDA Forest Service, Rocky Mountain Research Station. 281 pp.
- Sauer, J.R. 1993. Monitoring Goals and Programs of the U.S. Fish and Wildlife Service. In Finch, D.M. and P.W. Stangel (eds.) Status and Management of Neotropical Migratory Birds; 1992 Sept. 21-25; Estes Park, CO: Gen. Tech. Rep. RM-229. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station:Fort Collins, CO. 422 pp.
- Thomas, L., J.L. Laake, J.F. Derry, S.T. Buckland, D.L. Borchers, D.R. Anderson, K.P. Burnham, S. Strindberg, S.L. Hedley, M.L. Burt, F.F.C. Marques, J.H. Pollard, and R.M. Fewster. 1998 99. *Distance 3.5*. Research Unit for Wildlife Population Assessment, University of St. Andrews, UK.
- U.S. Fish & Wildlife Service. 2003. Birding in the United States: A Demographic and Economic Analysis. Addendum to the 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation. Report 2001-1. Washington, D.C. 24 pp.

APPENDIX A - Species Distribution Maps

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 point transect divided by the number of point counts conducted on that transect.

Sharp-tailed Grouse



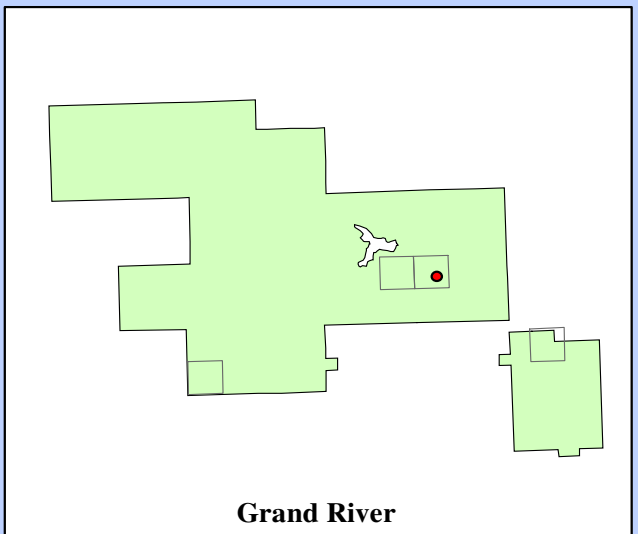
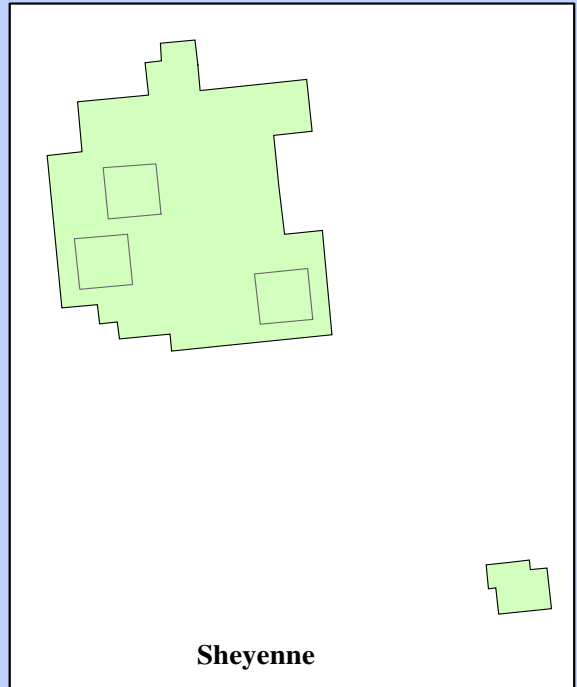
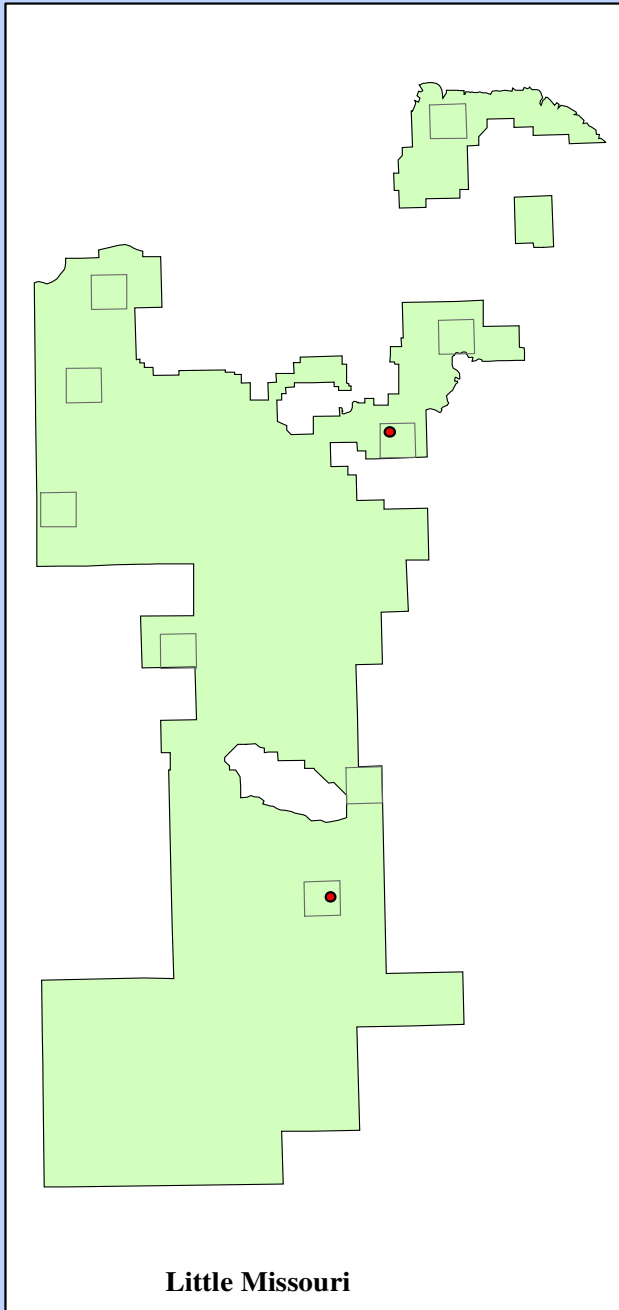
Legend



- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.13 | National Grassland Boundary |
| 0.14 - 0.25 | |

0 10 20 40 Miles

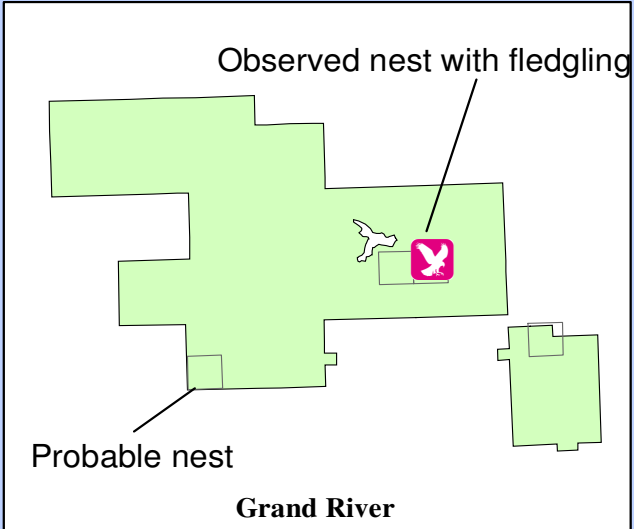
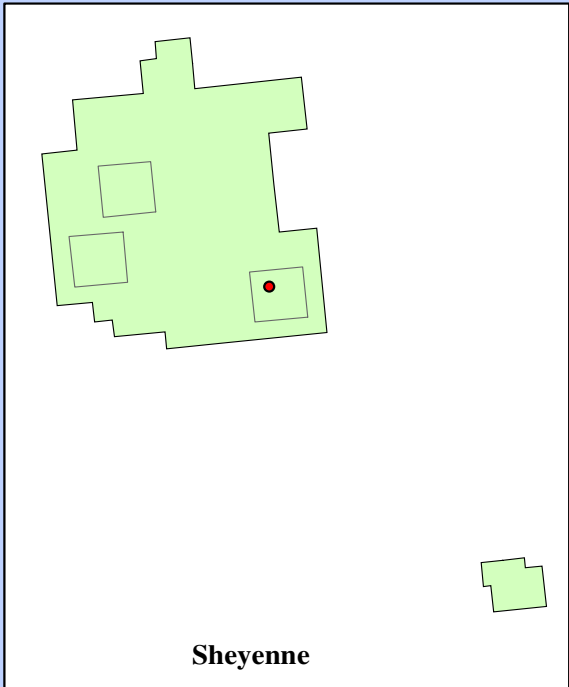
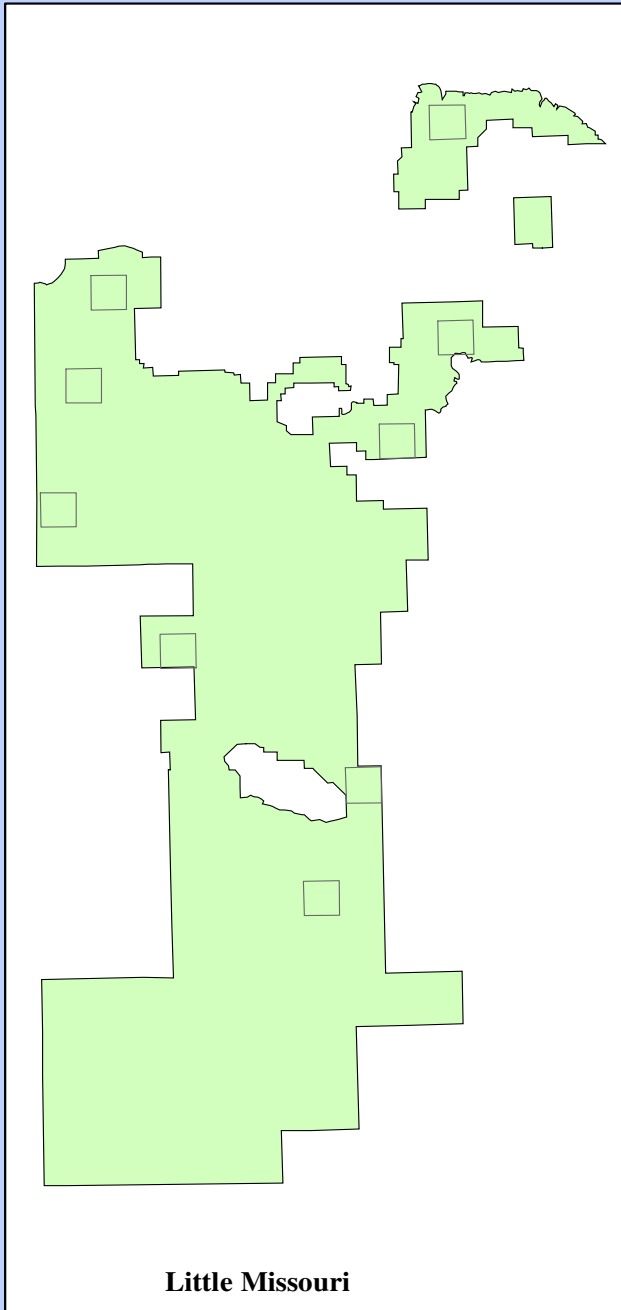


Northern Harrier



Legend		0 10 20 40 Miles		N ↑ ↓
Index of abundance	□ Survey Blocks	 		
● 0.13	■ National Grassland Boundary			

Ferruginous Hawk



Legend

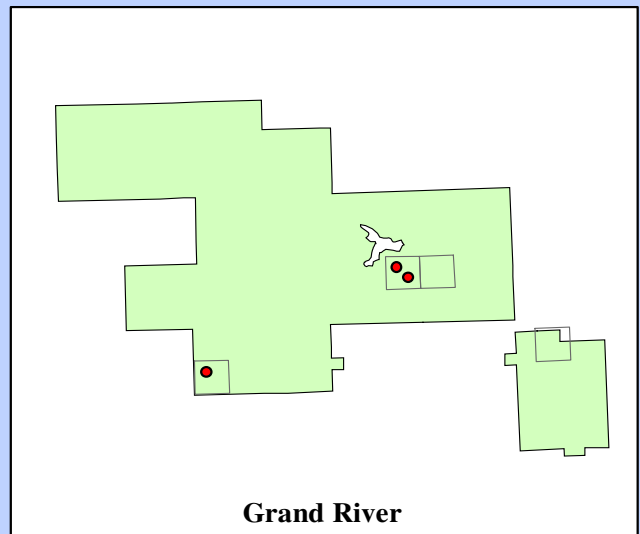
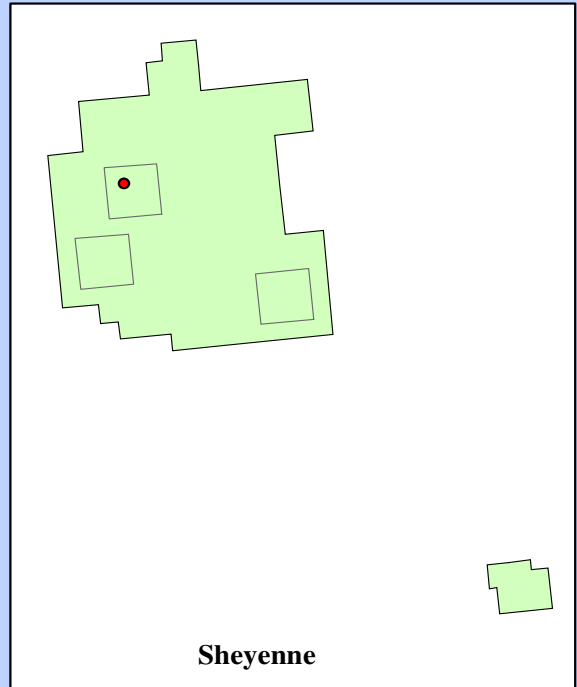
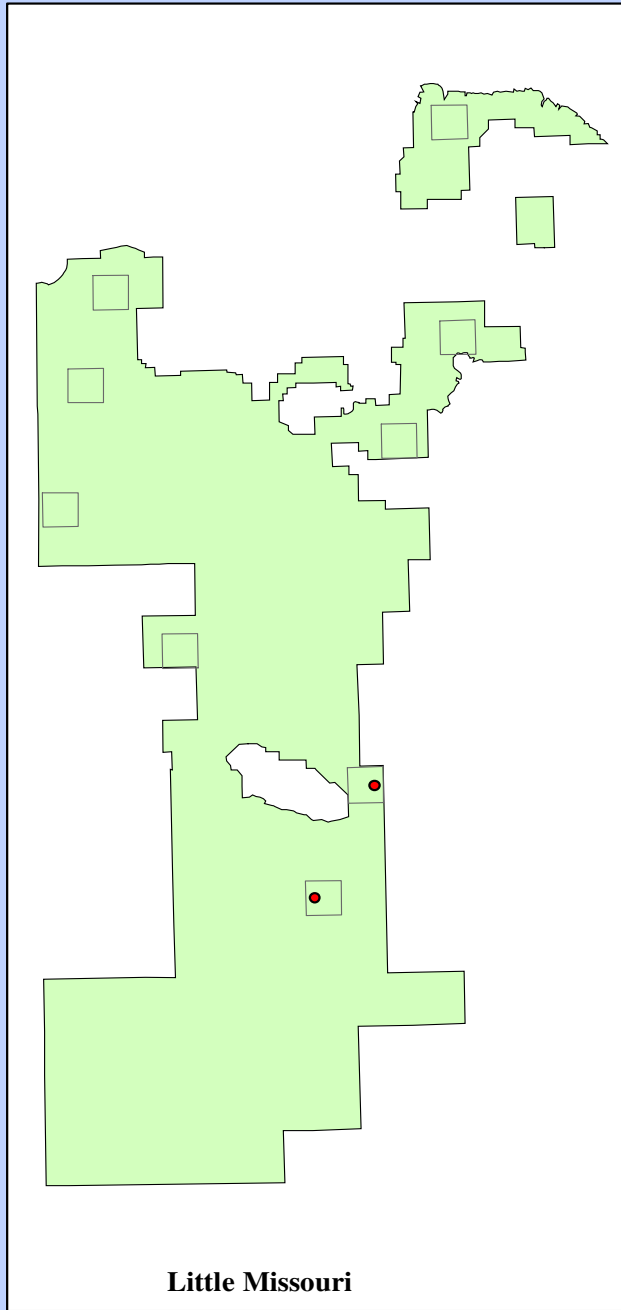
Index of abundance

- 0.13

Survey Blocks
 National Grassland Boundary



Killdeer



Legend




Index of abundance

- 0.10 - 0.38

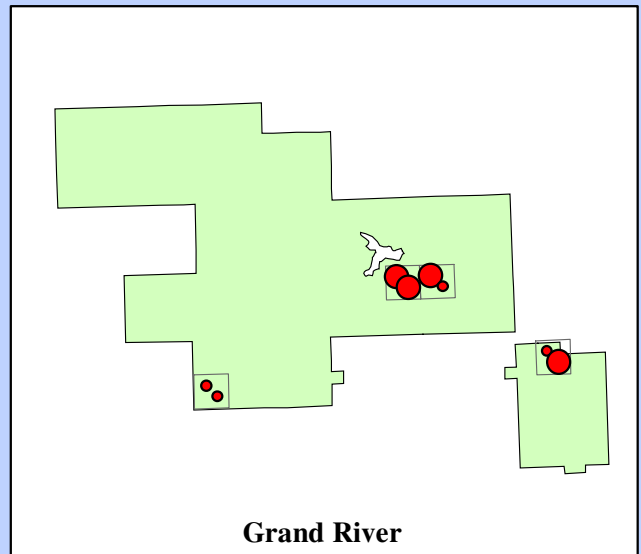
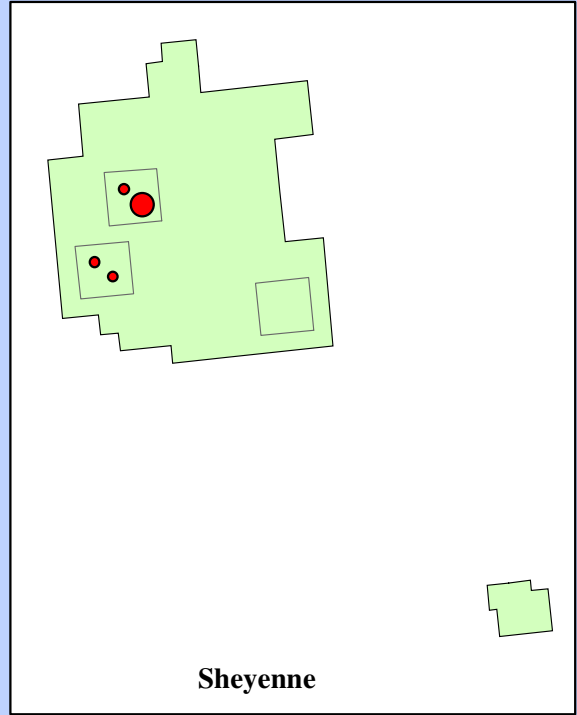
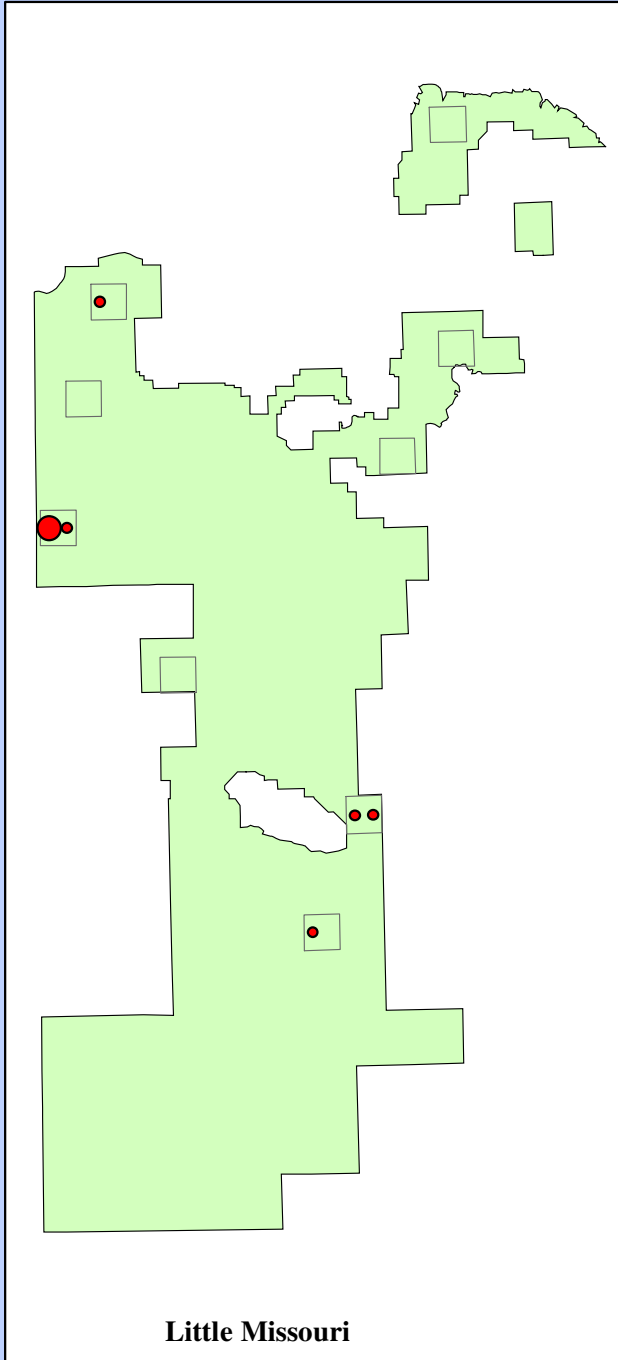
□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles

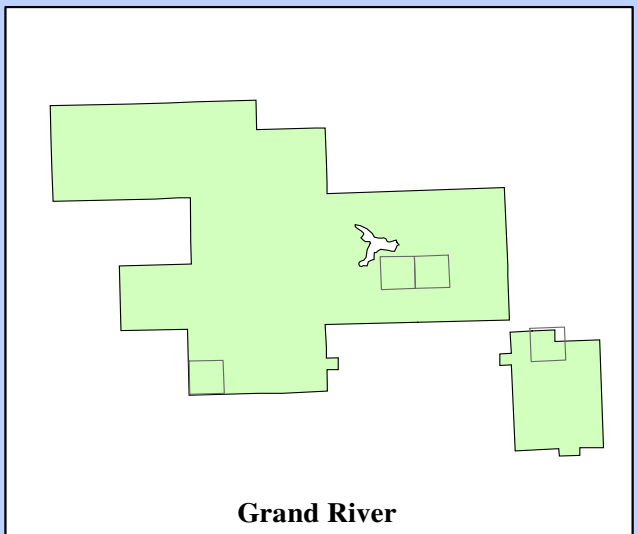
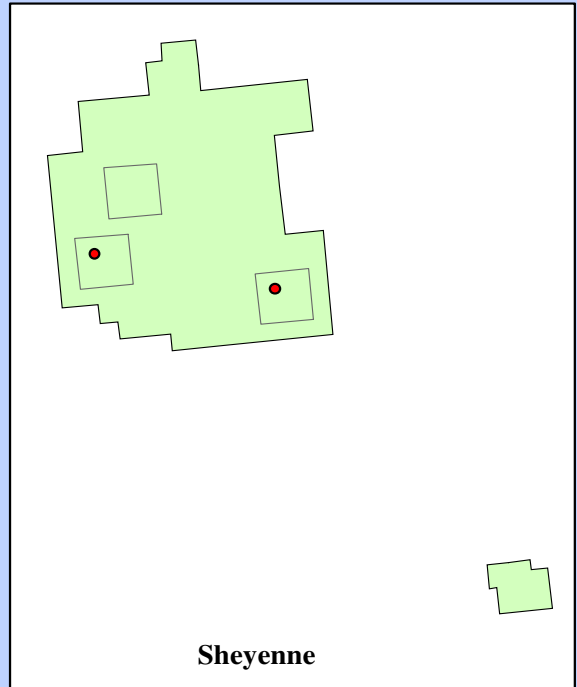
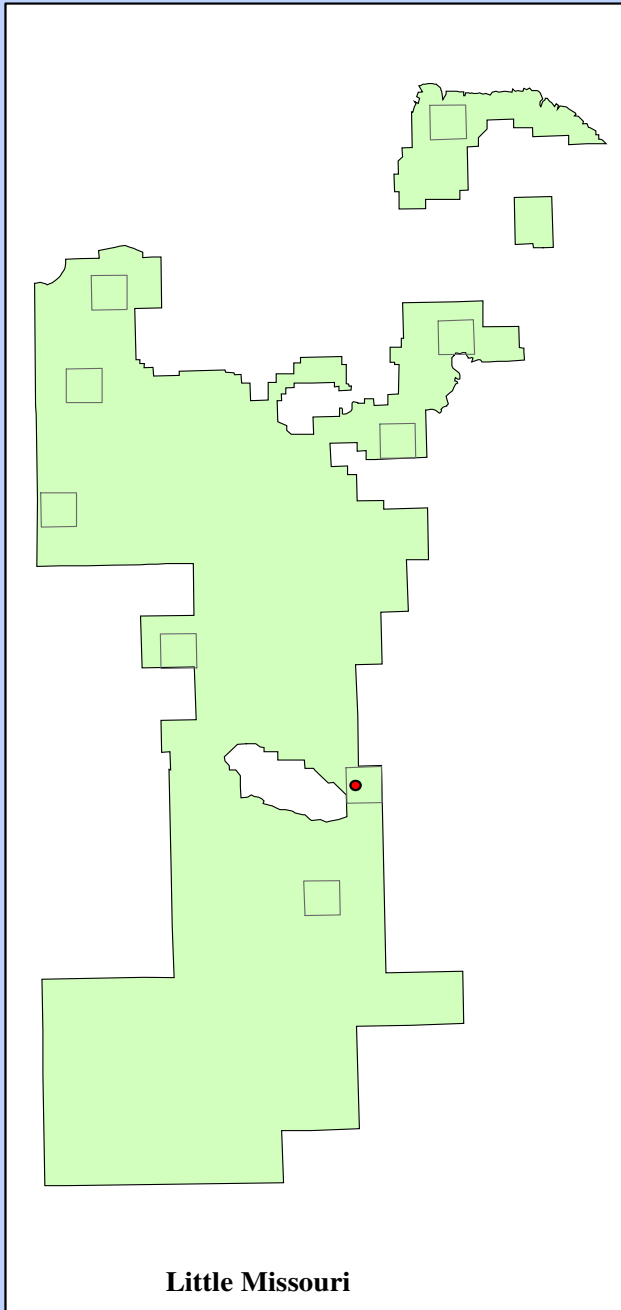


Upland Sandpiper



Legend		0 10 20 40 Miles		N ↑ ↓
Index of abundance	Survey Blocks	National Grassland Boundary		
<ul style="list-style-type: none"> 0.10 - 0.63 0.64 - 1.50 				

Marbled Godwit



Legend

Index of abundance

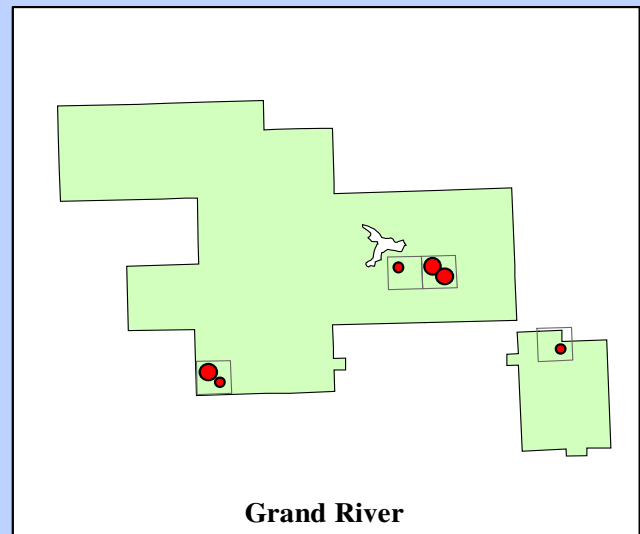
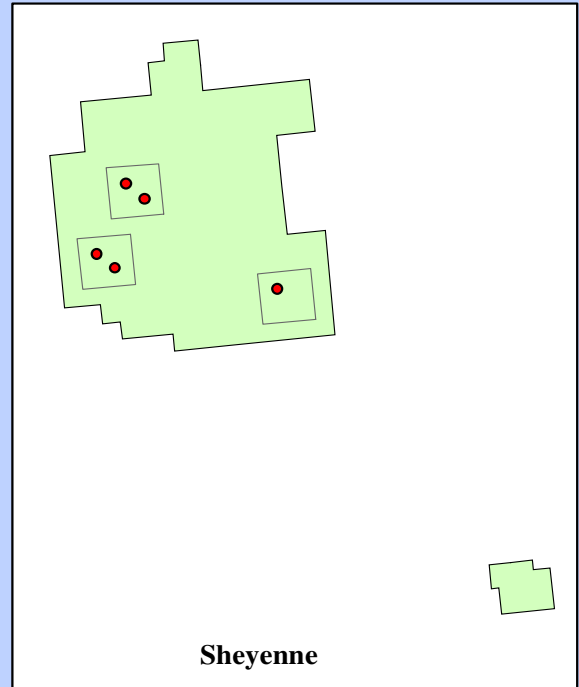
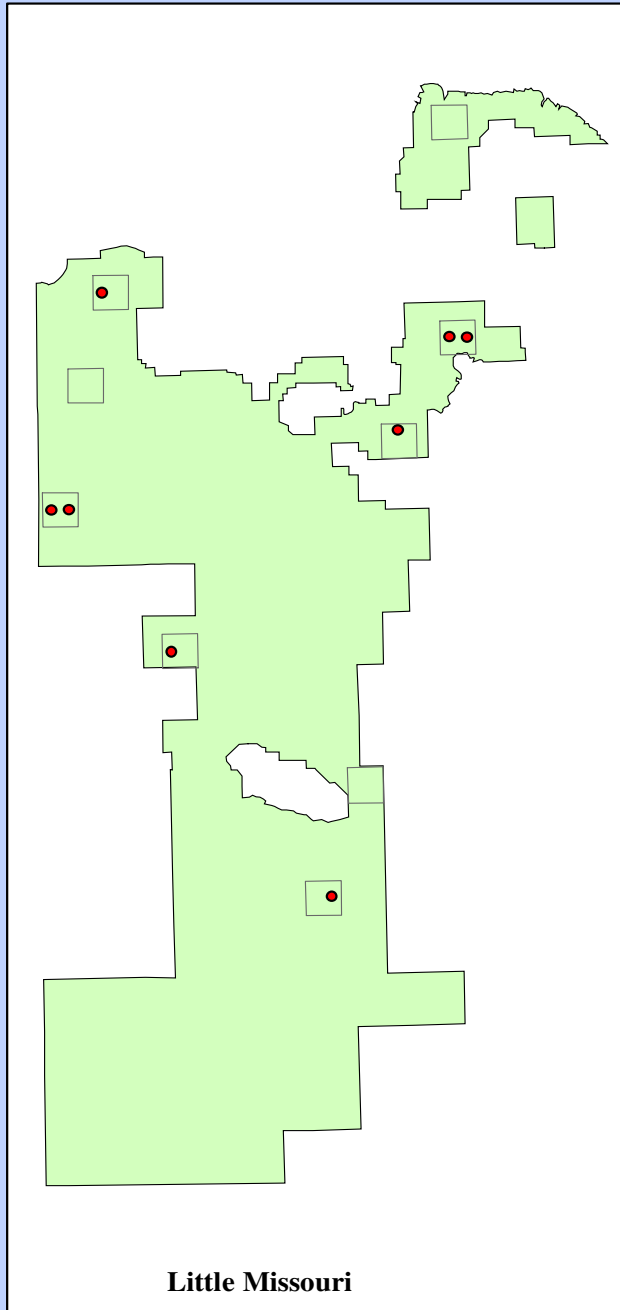
- 0.13 - 0.25

Survey Blocks

National Grassland Boundary



Mourning Dove



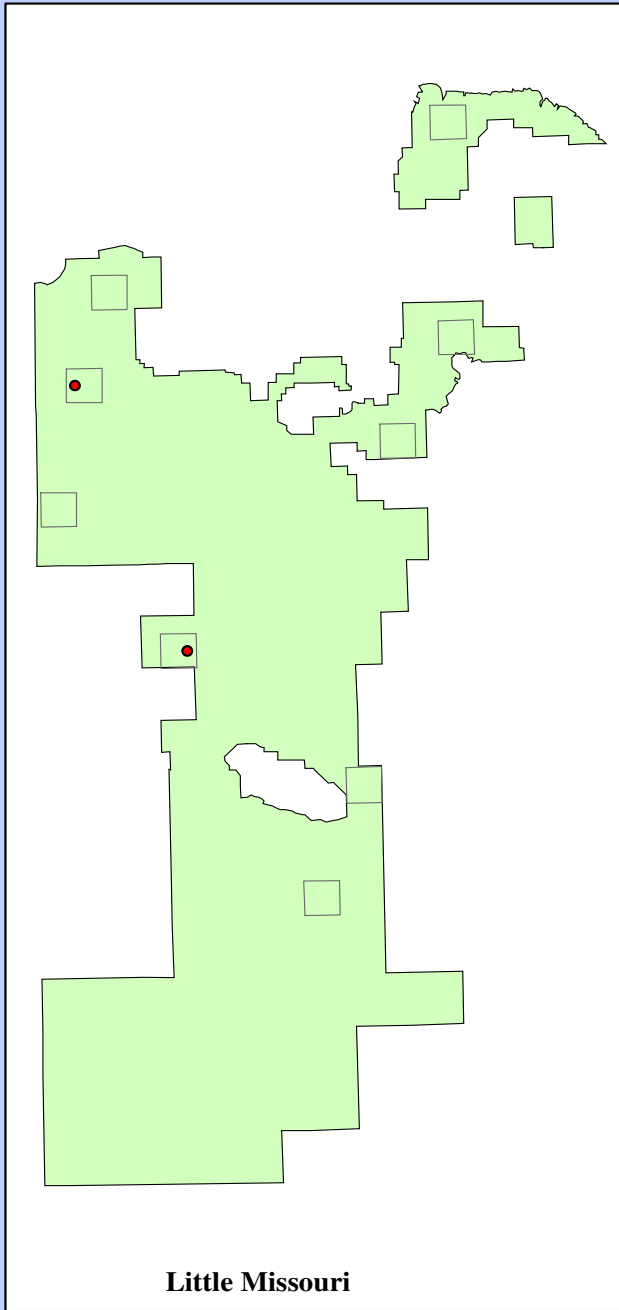
Legend

- Index of abundance**
- Survey Blocks
 - National Grassland Boundary
 - 0.13 - 0.38
 - 0.39 - 0.75

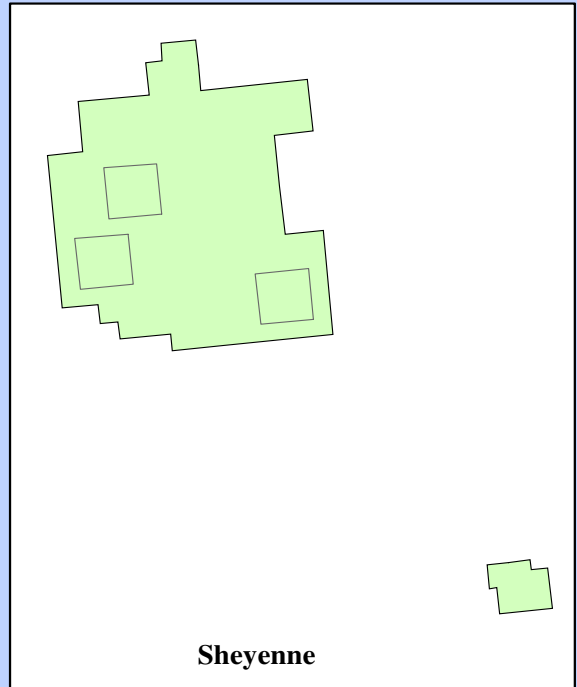
0 10 20 40 Miles



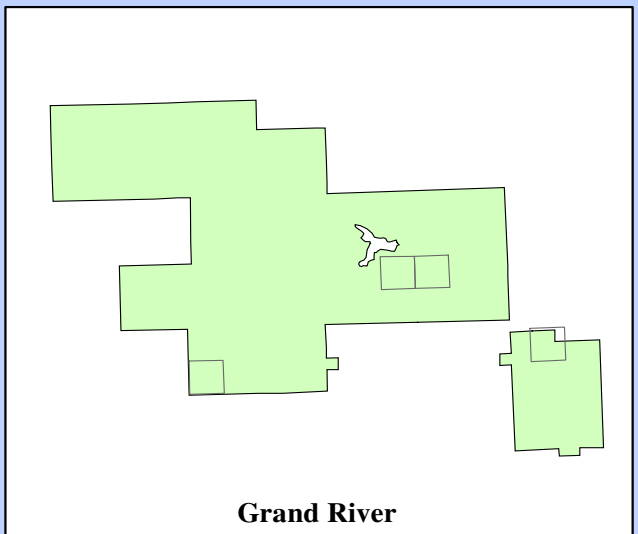
Say's Phoebe



Little Missouri



Sheyenne



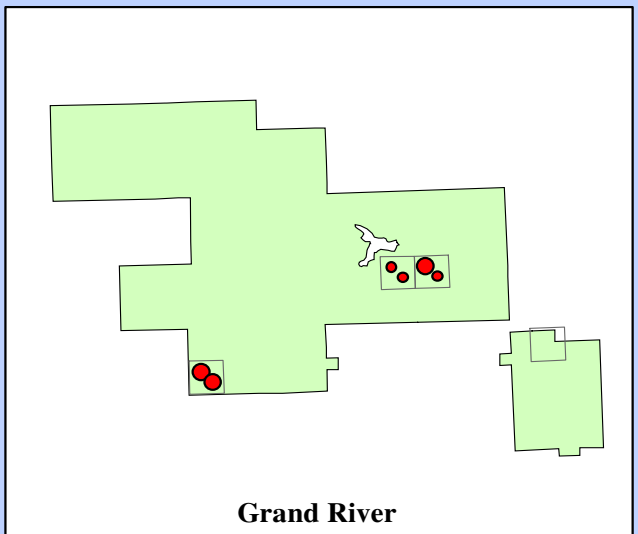
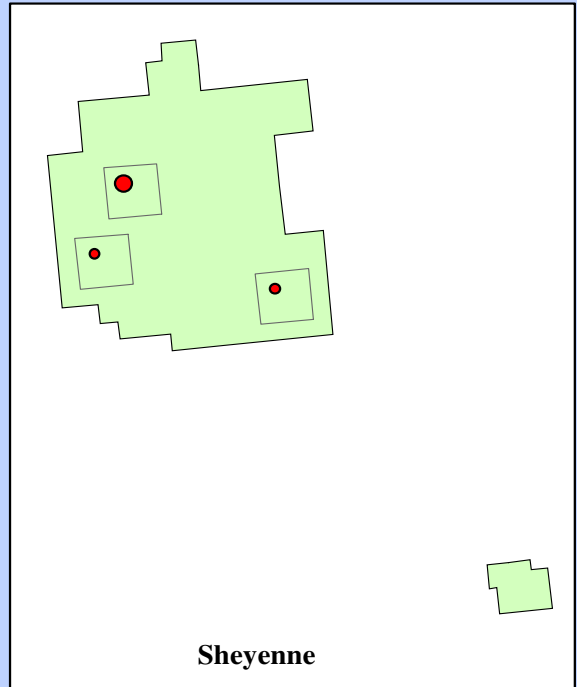
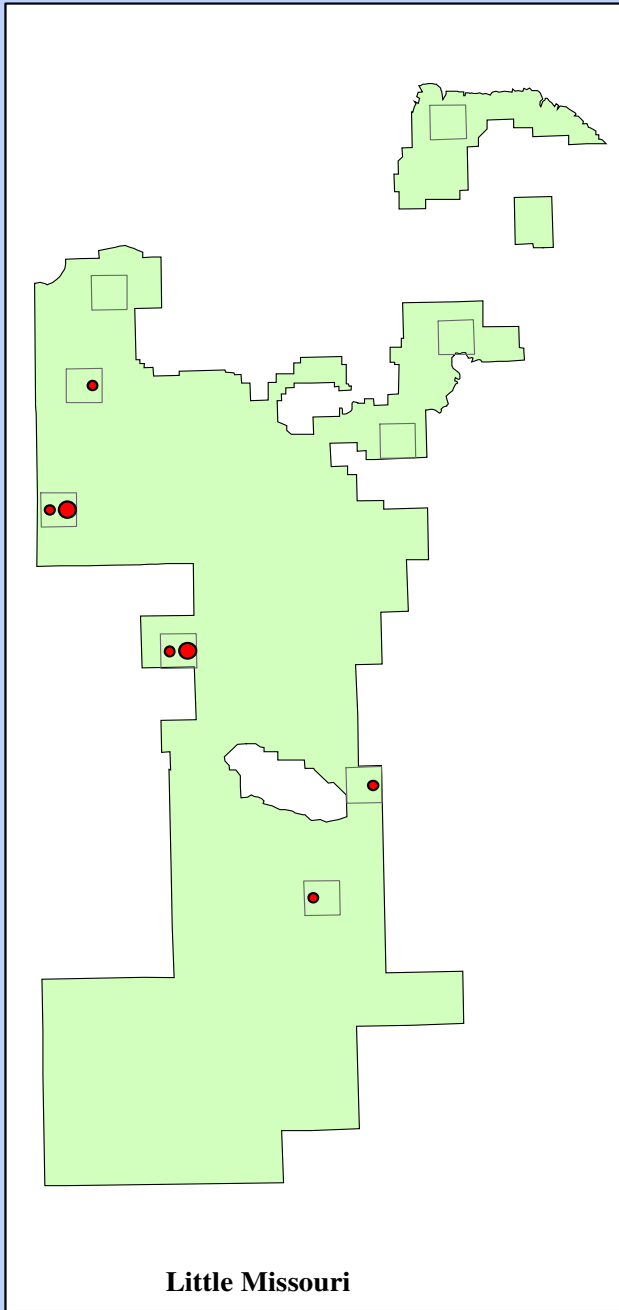
Grand River

Legend

- Index of abundance**
- 0.13 - 0.25
- Survey Blocks**
- Survey Blocks
- National Grassland Boundary**
- National Grassland Boundary



Eastern Kingbird



Legend

Index of abundance

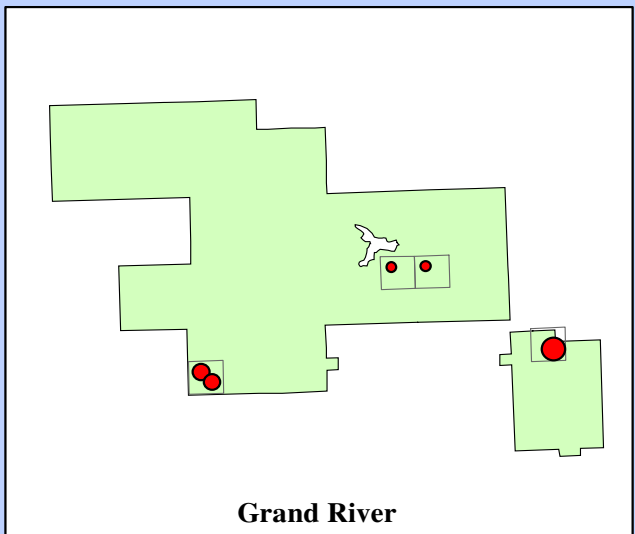
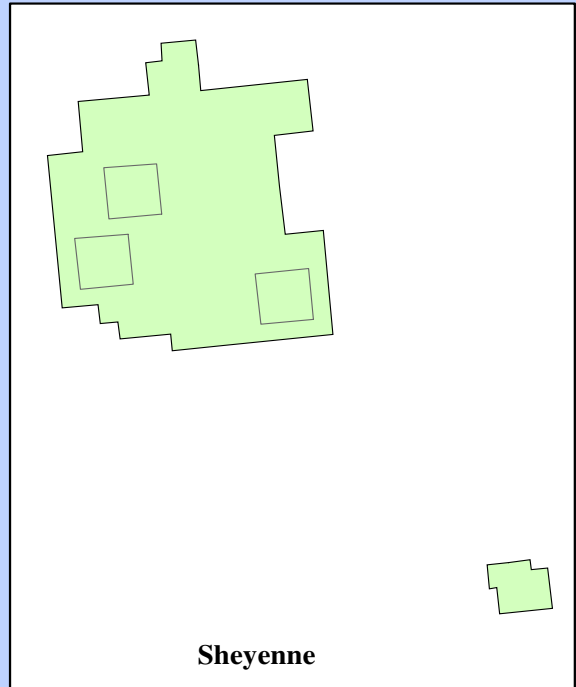
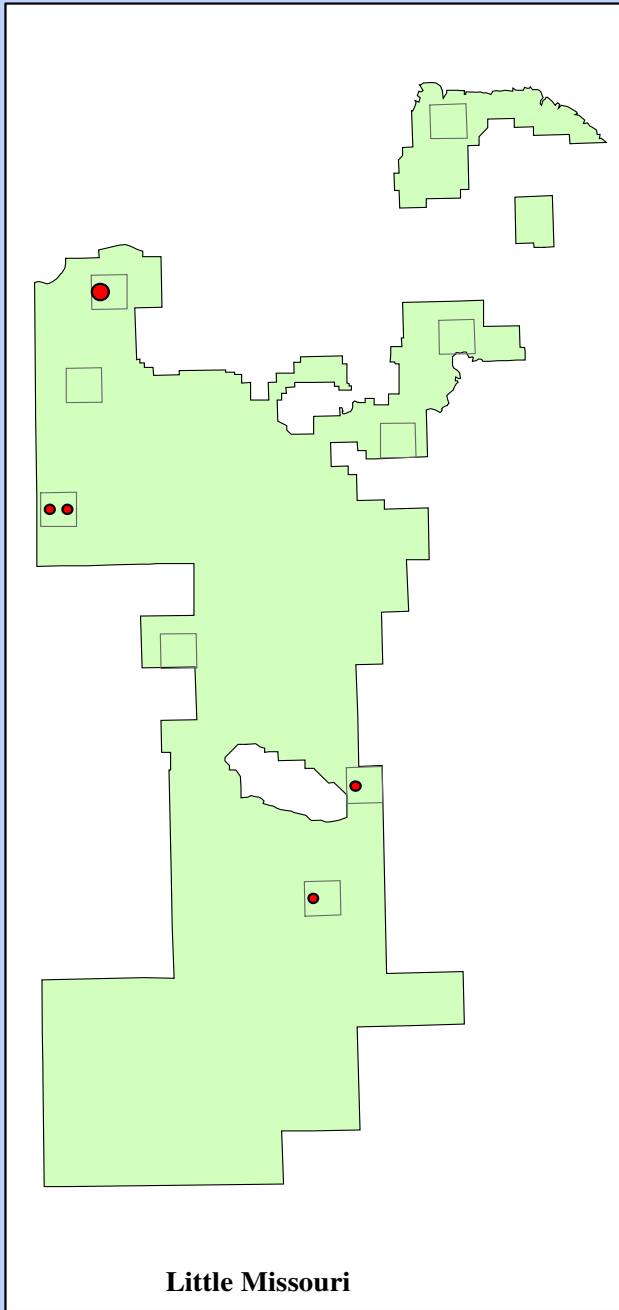
- 0.10 - 0.25
- 0.26 - 0.75

Survey Blocks

National Grassland Boundary

0 10 20 40 Miles

Horned Lark



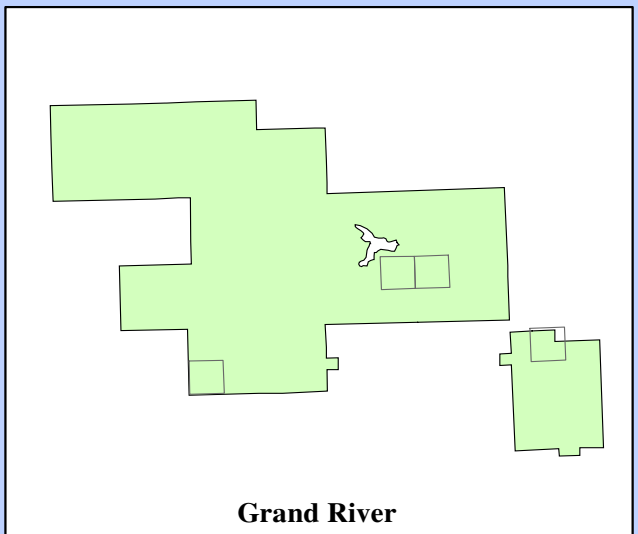
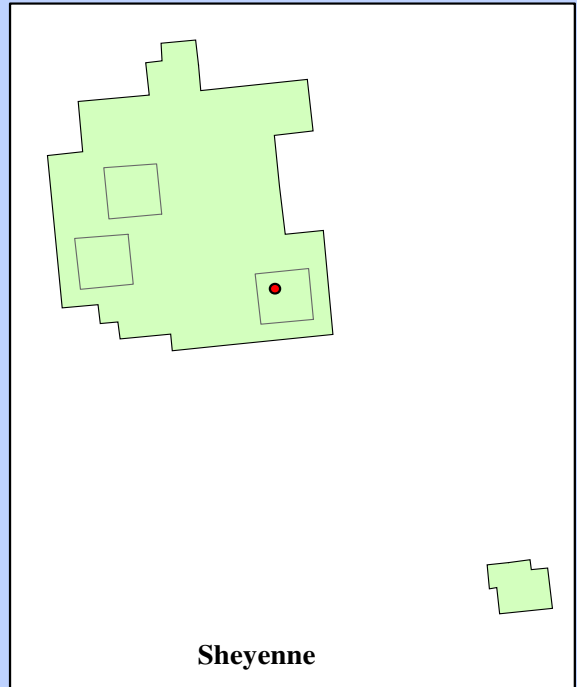
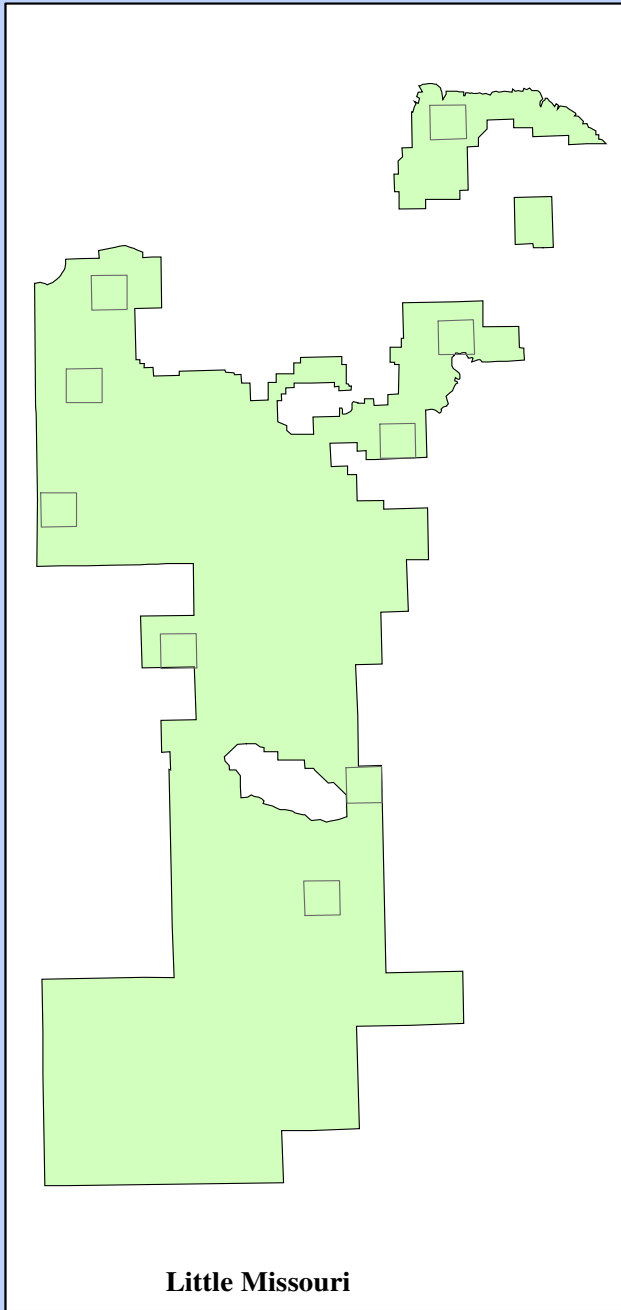
Legend

- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.10 - 0.25 | National Grassland Boundary |
| 0.26 - 0.50 | |
| 0.51 - 1.63 | |

0 10 20 40 Miles



Mountain Bluebird



Legend

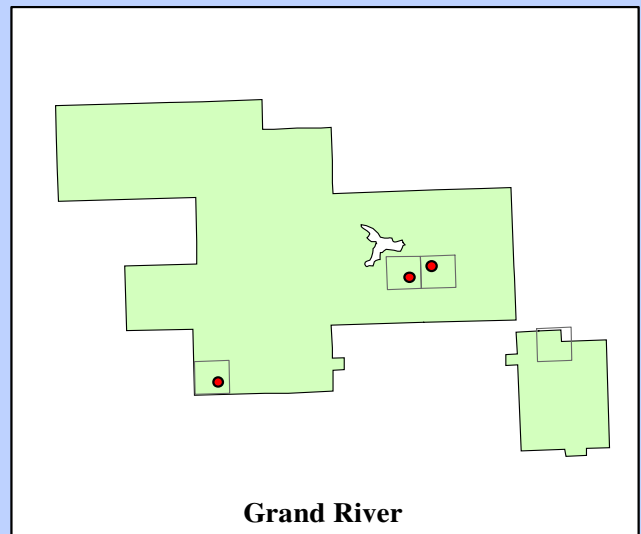
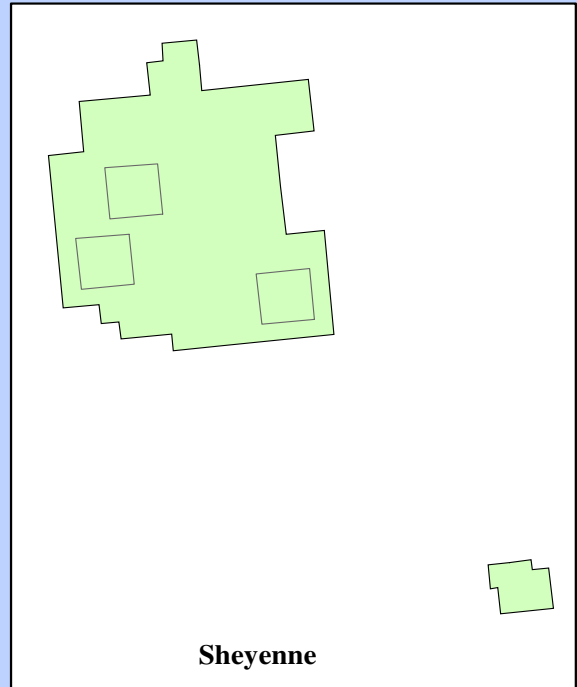
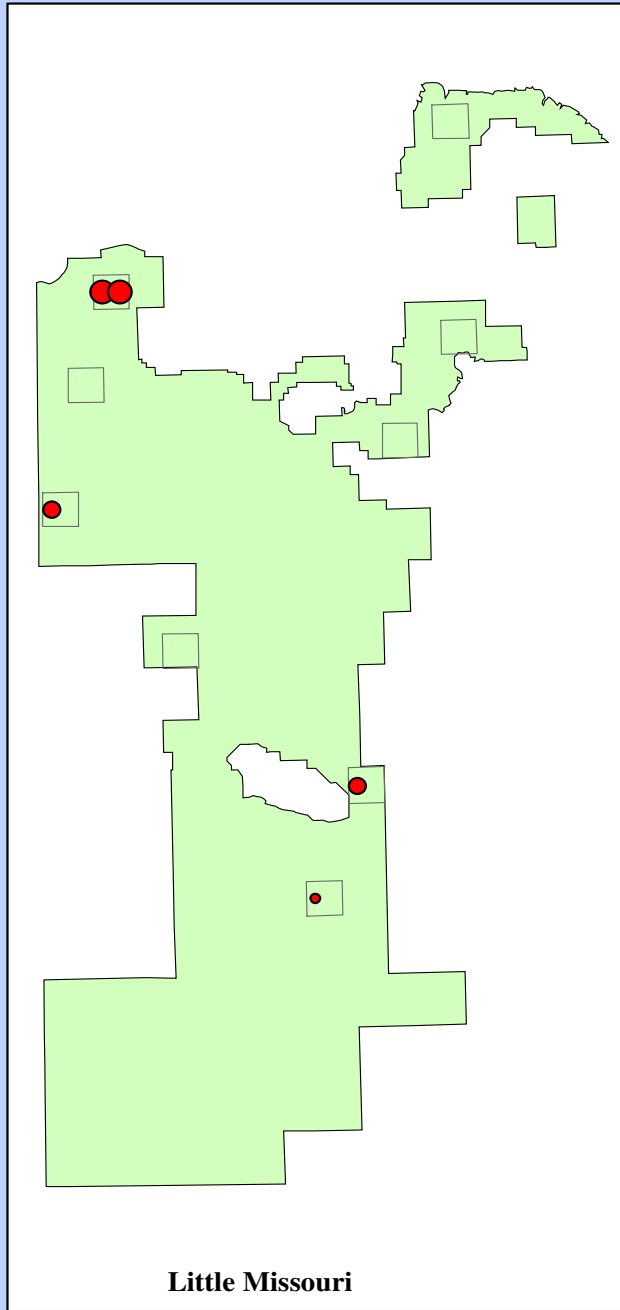
Index of abundance

- Survey Blocks
- National Grassland Boundary

0.13



Sprague's Pipit



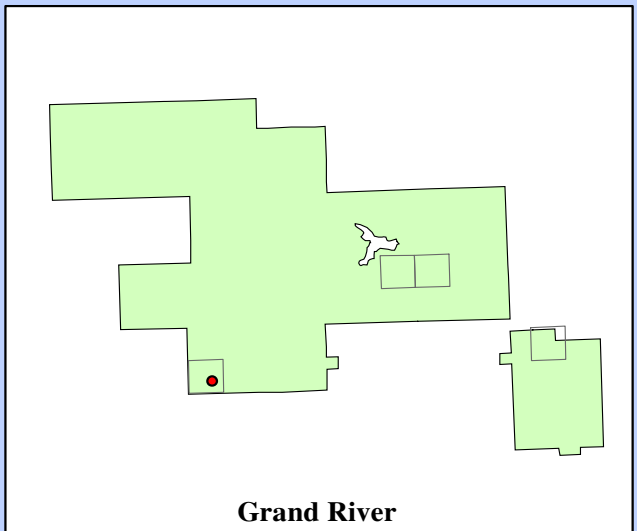
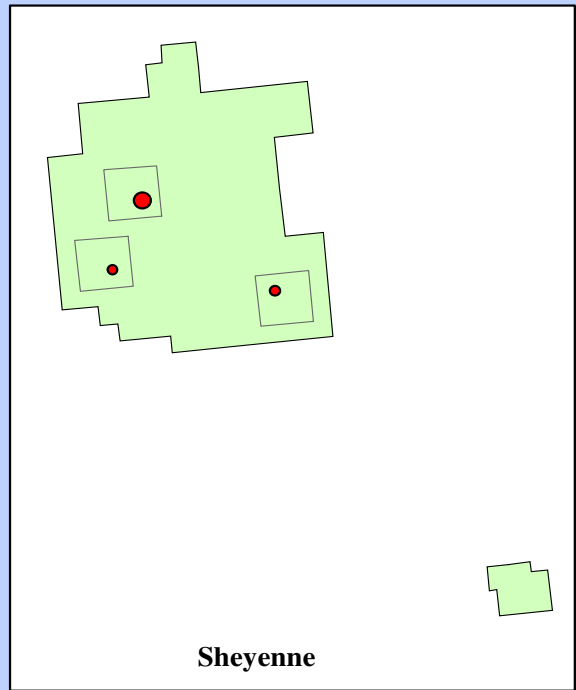
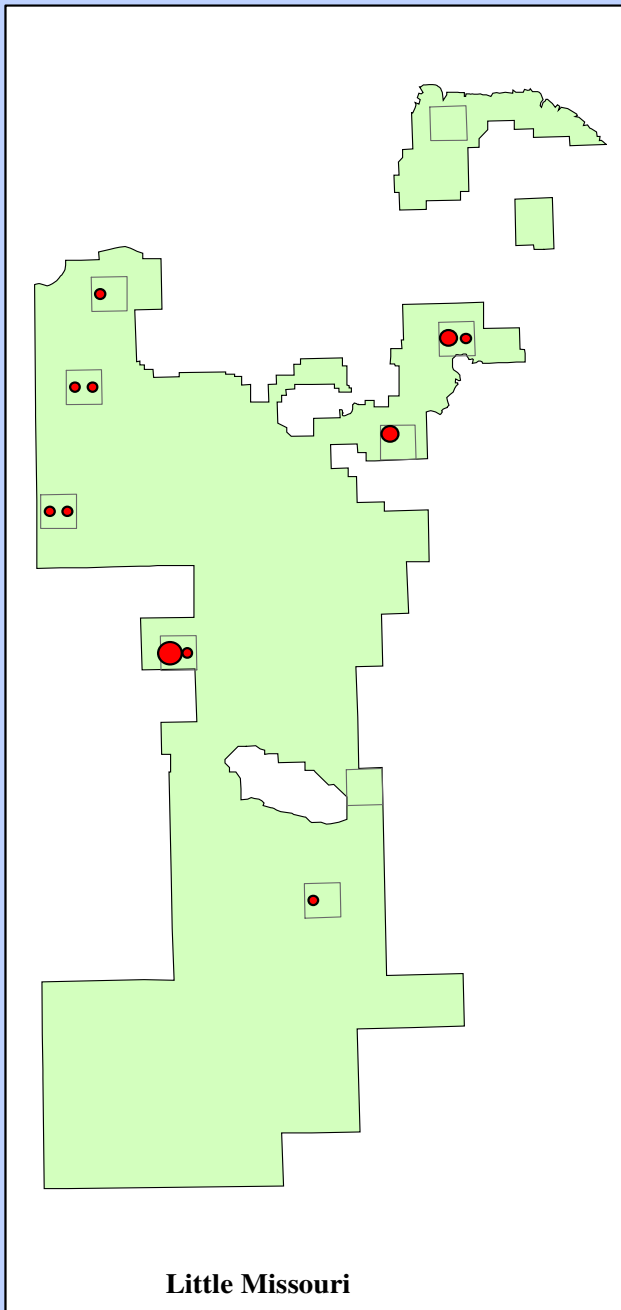
Legend



- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.25 | National Grassland Boundary |
| 0.26 - 0.40 | |
| 0.41 - 1.25 | |

0 10 20 40 Miles

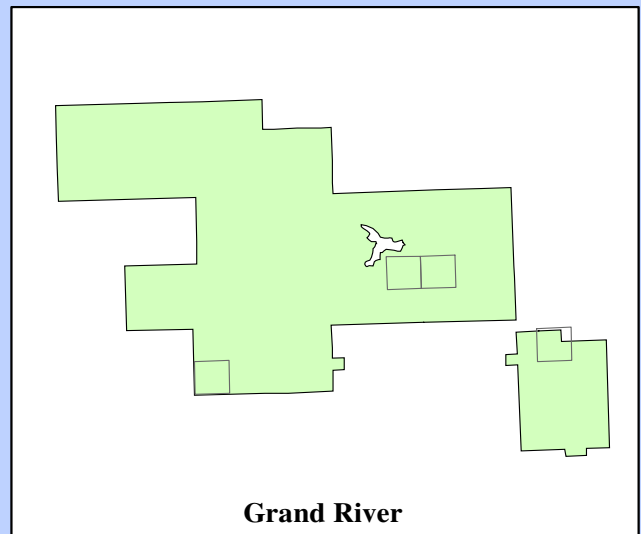
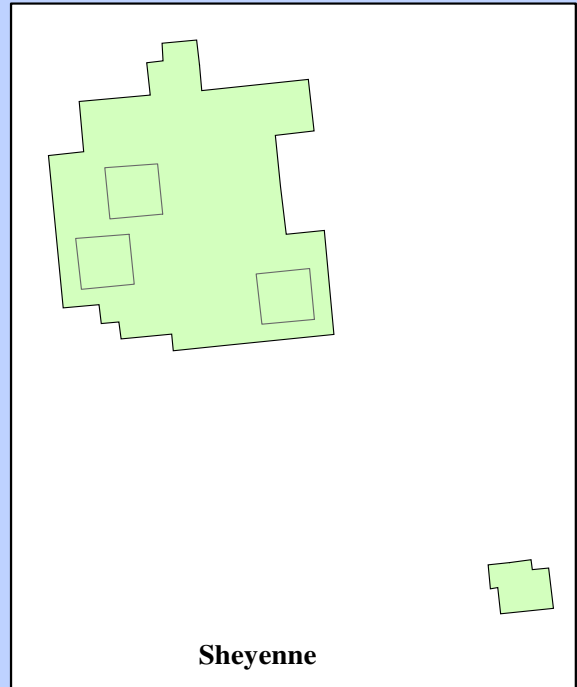
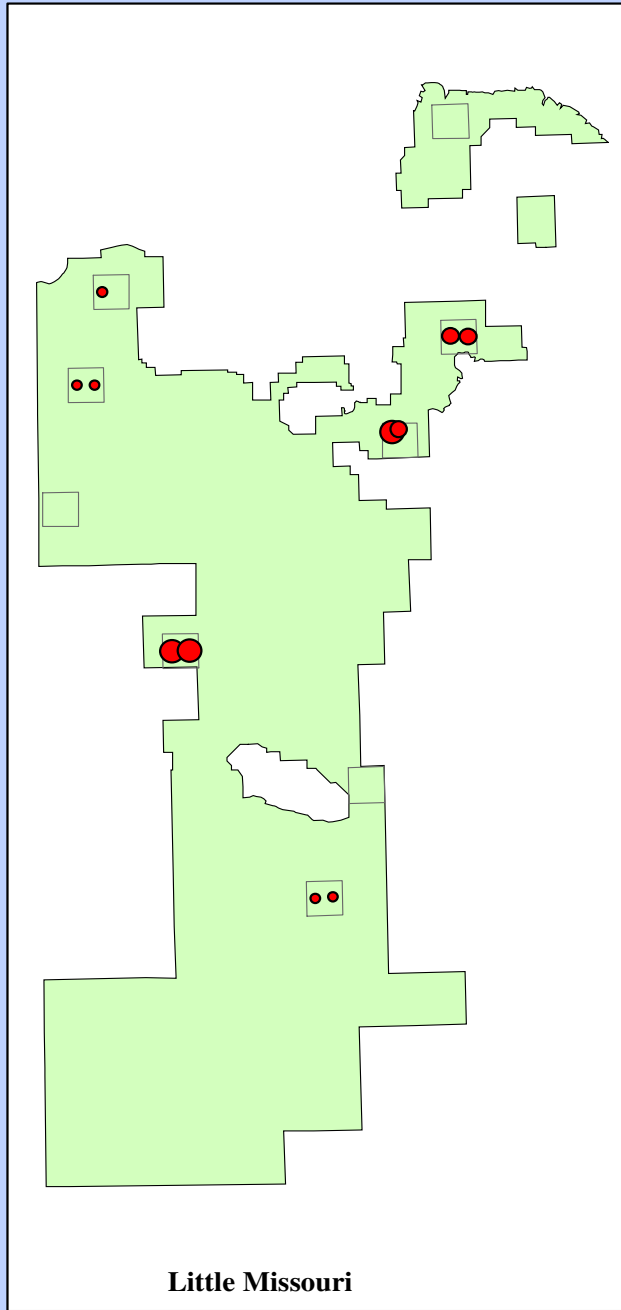


Yellow Warbler



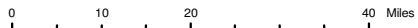
Legend		0 10 20 40 Miles		N ↑ ↓
Index of abundance	□ Survey Blocks			
● 0.13 - 0.25	■ National Grassland Boundary			
● 0.26 - 0.50		 		
● 0.51 - 1.25				

Spotted Towhee

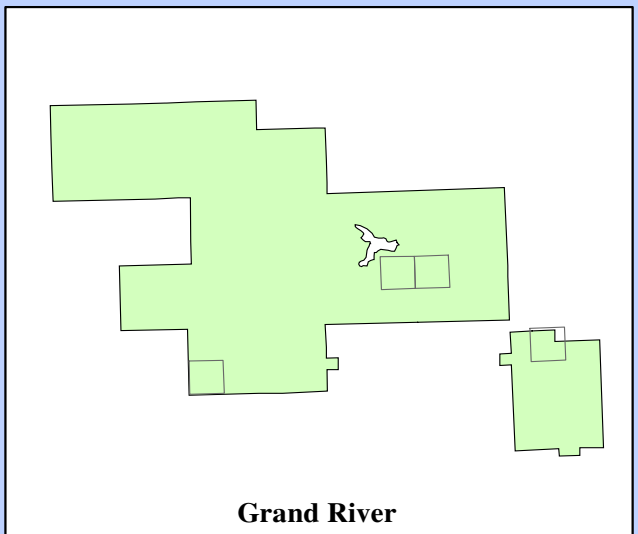
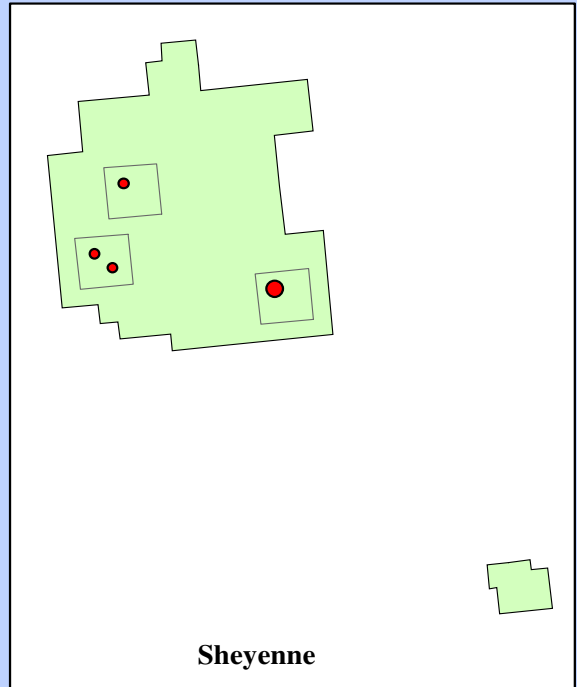
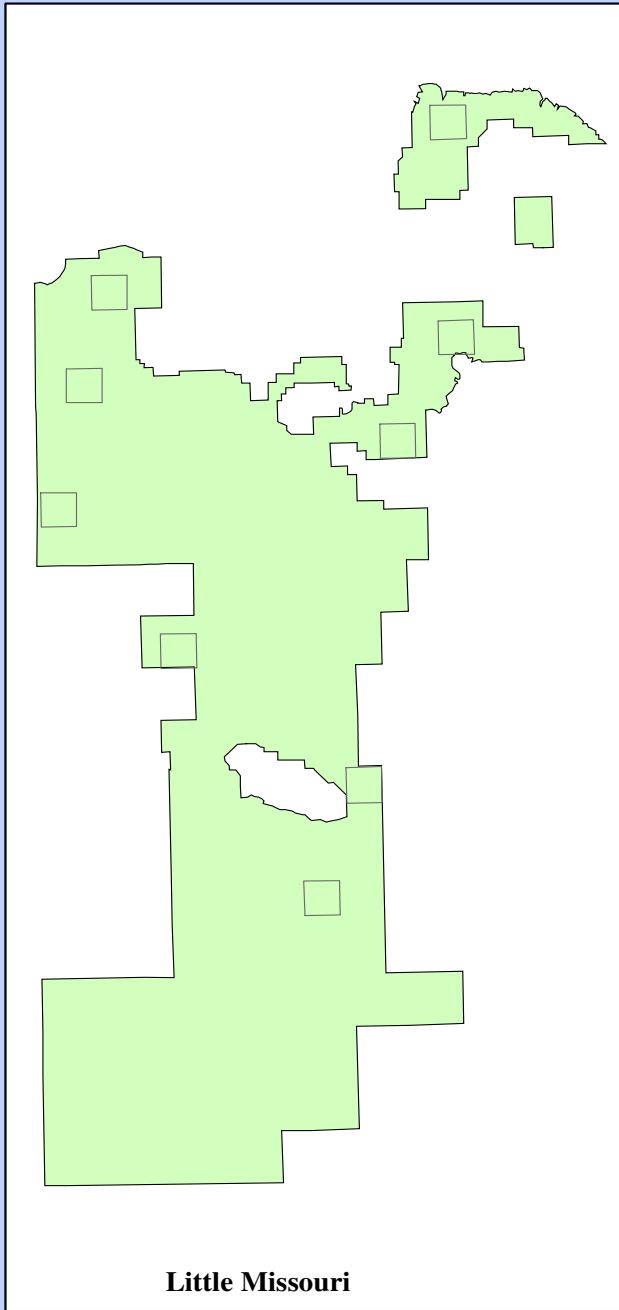


Legend

Index of abundance	Survey Blocks
0.13 - 0.25	National Grassland Boundary
0.26 - 0.75	
0.76 - 1.50	



Clay-colored Sparrow



Legend

Index of abundance

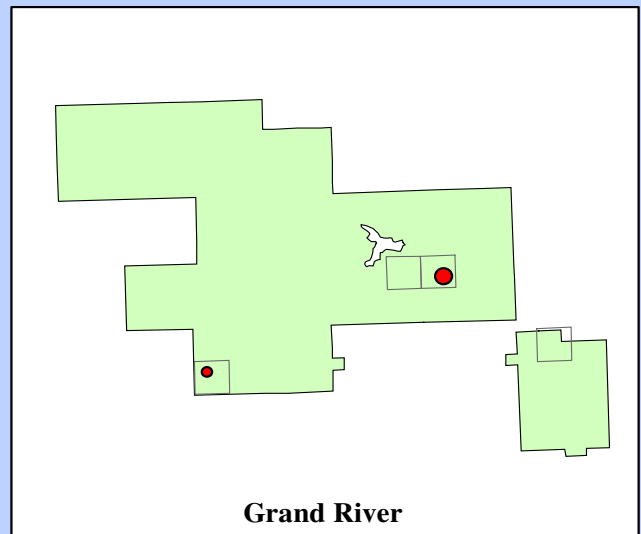
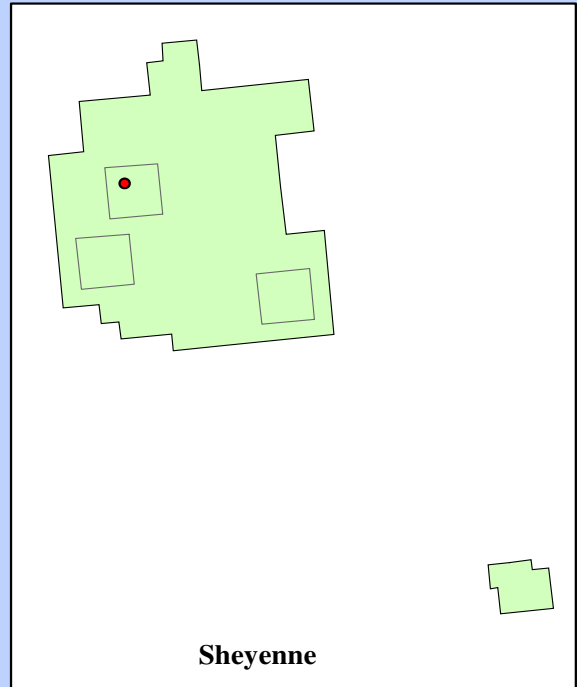
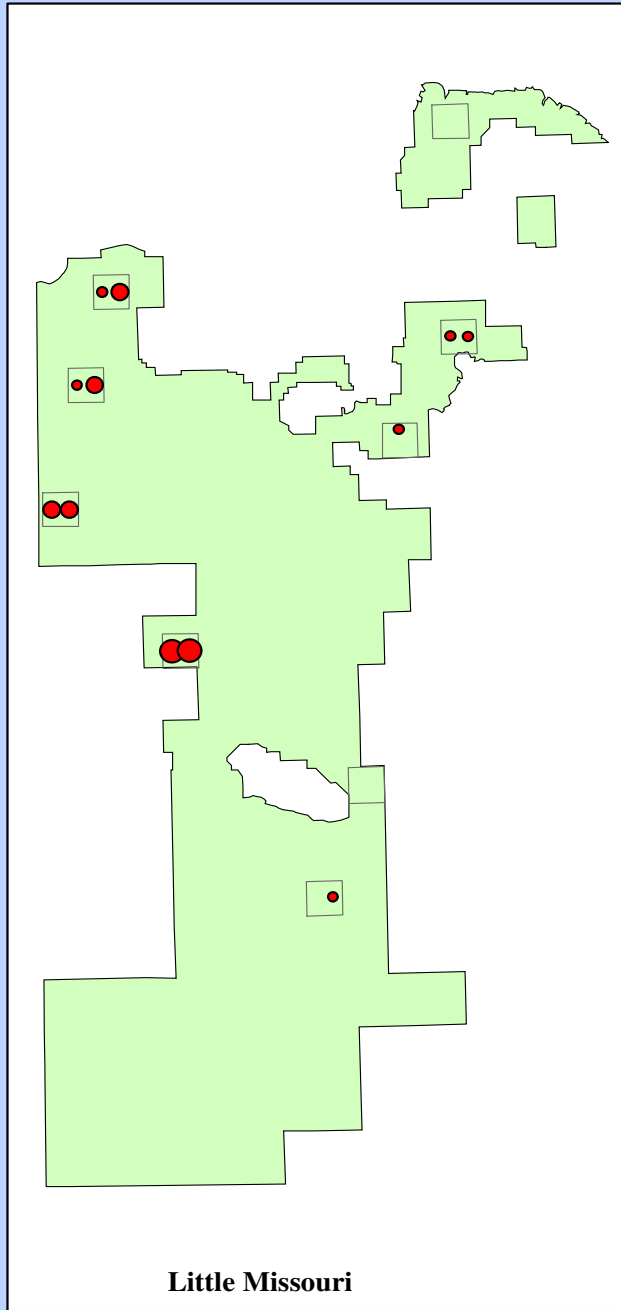
- 0.13 - 0.63
- 0.64 - 1.25

□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles

Vesper Sparrow



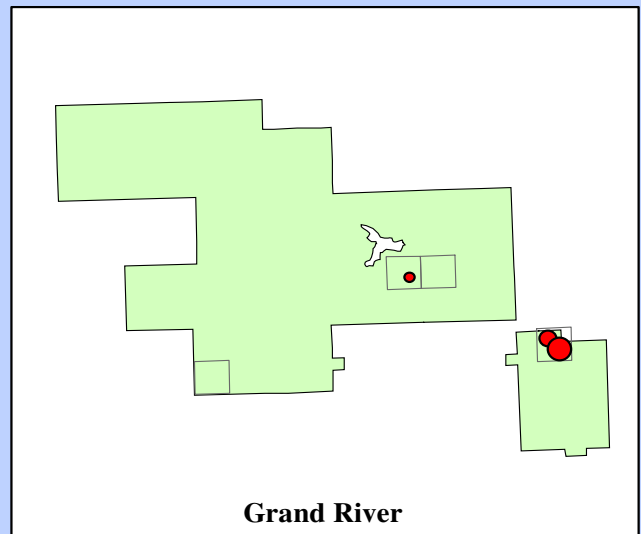
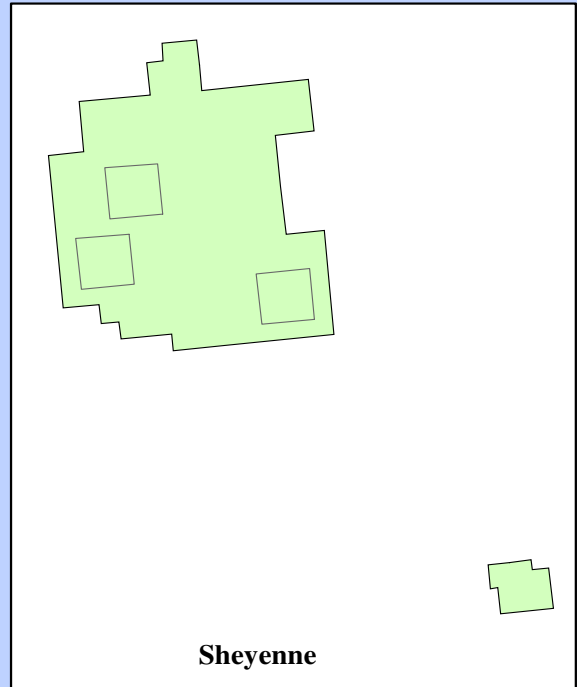
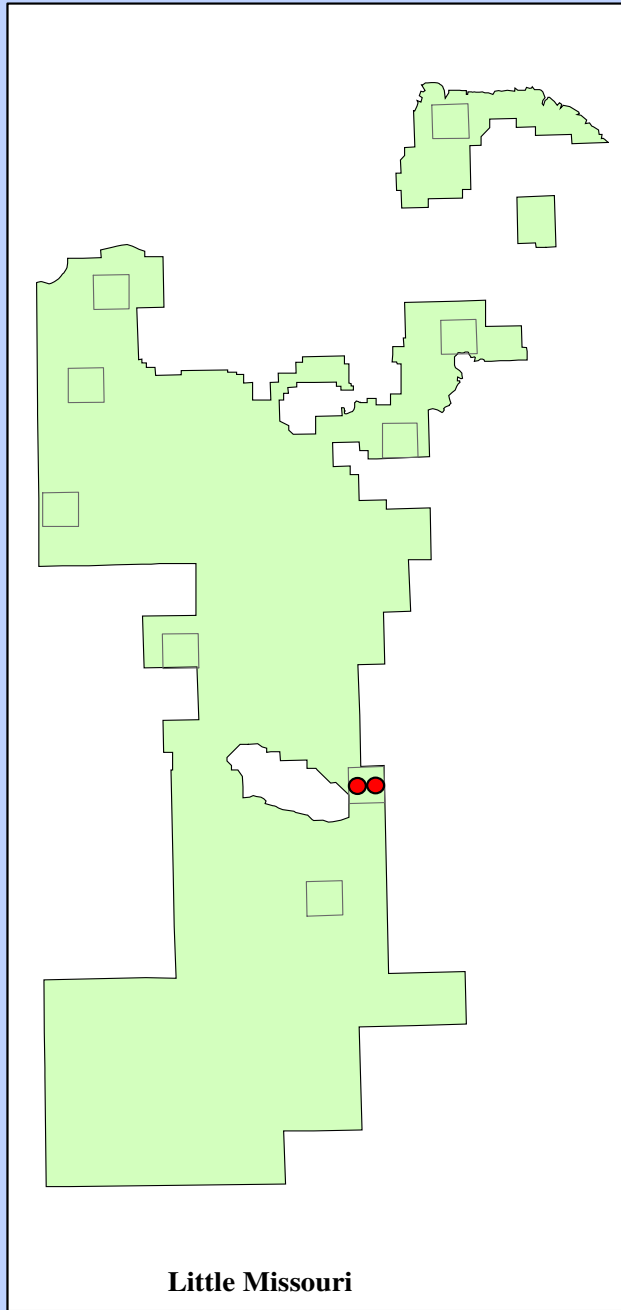
Legend

- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.13 - 0.25 | National Grassland Boundary |
| 0.26 - 0.38 | |
| 0.39 - 1.13 | |

0 10 20 40 Miles



Lark Bunting



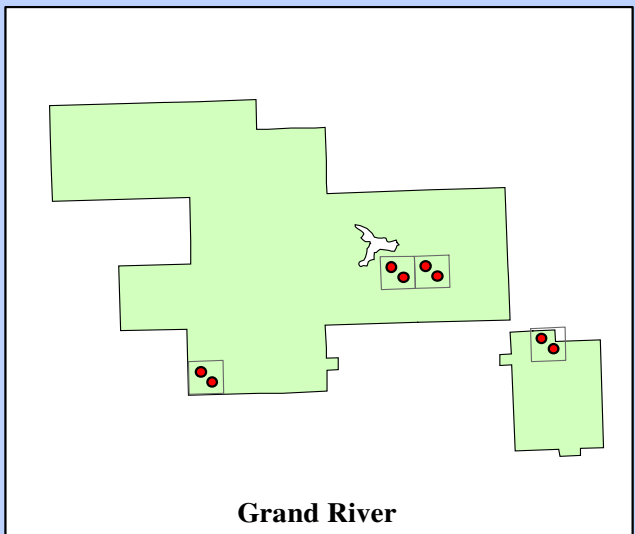
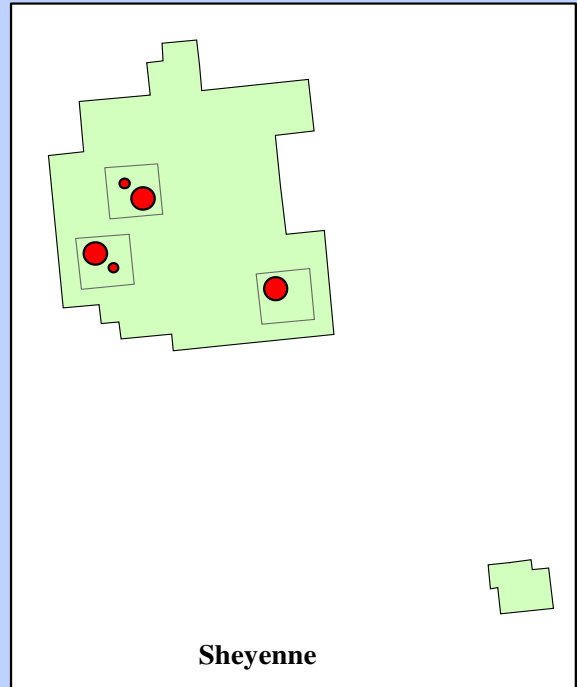
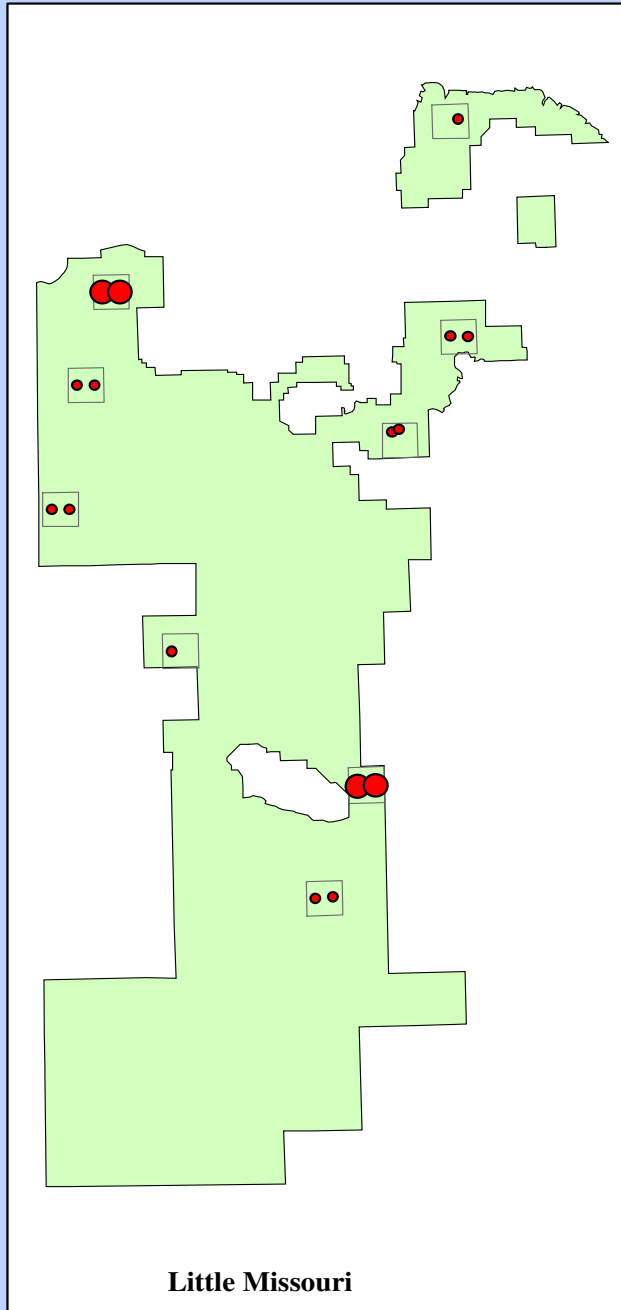
Legend

- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.13 | National Grassland Boundary |
| 0.14 - 1.63 | |
| 1.64 - 2.88 | |

0 10 20 40 Miles



Grasshopper Sparrow



Legend




Index of abundance

- 0.13 - 0.88
- 0.89 - 1.90

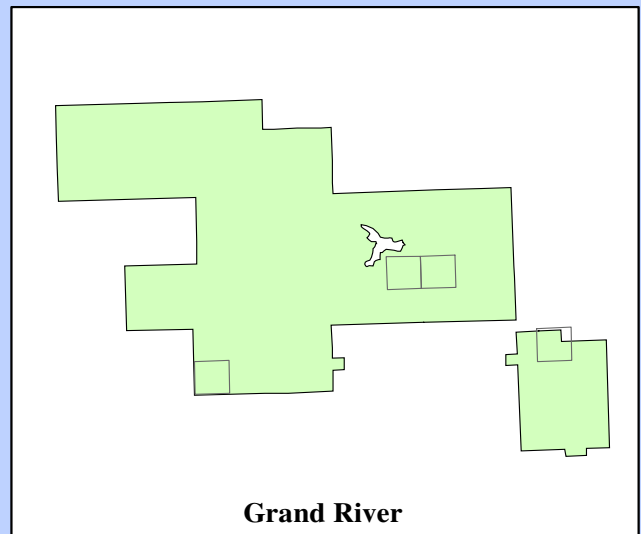
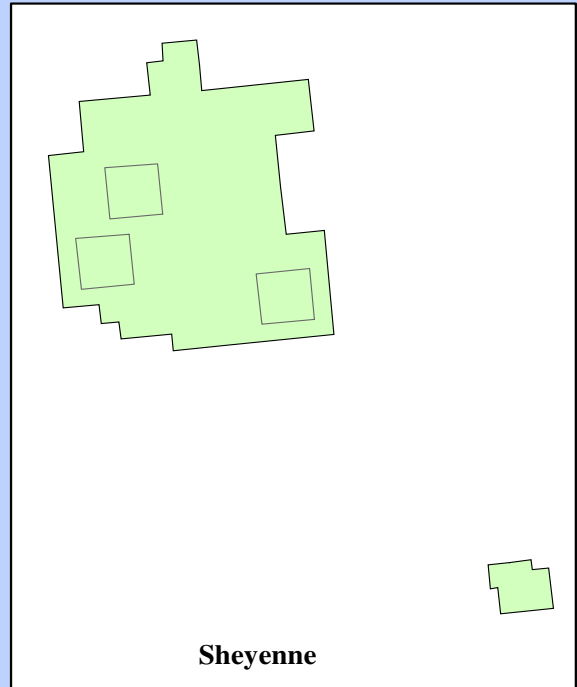
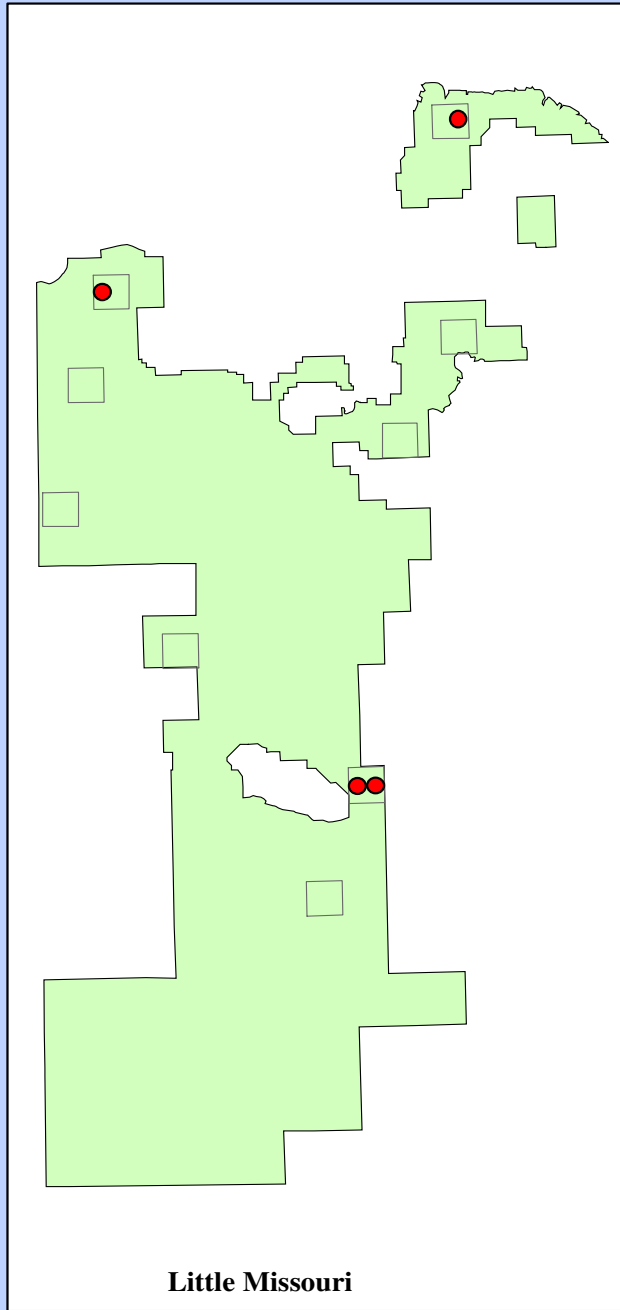
□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles

Baird's Sparrow

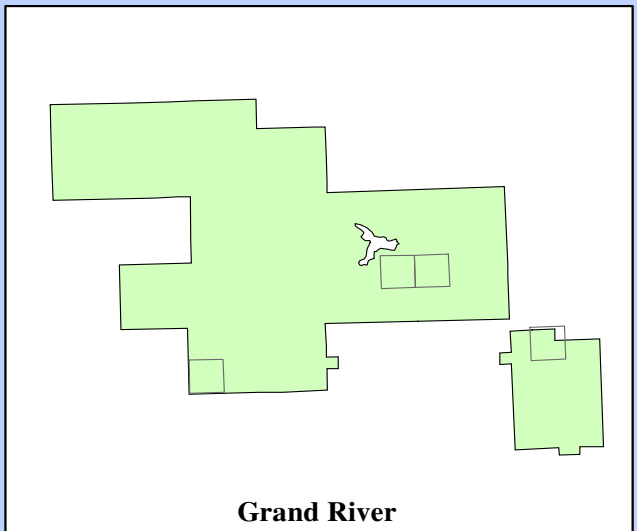
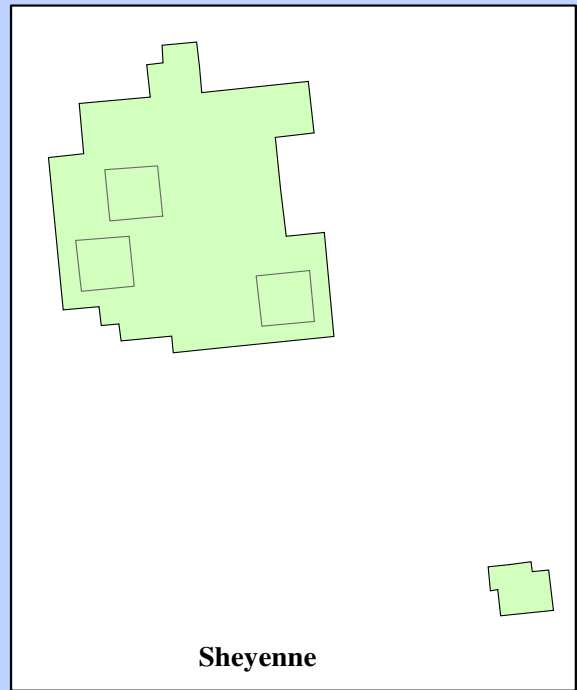
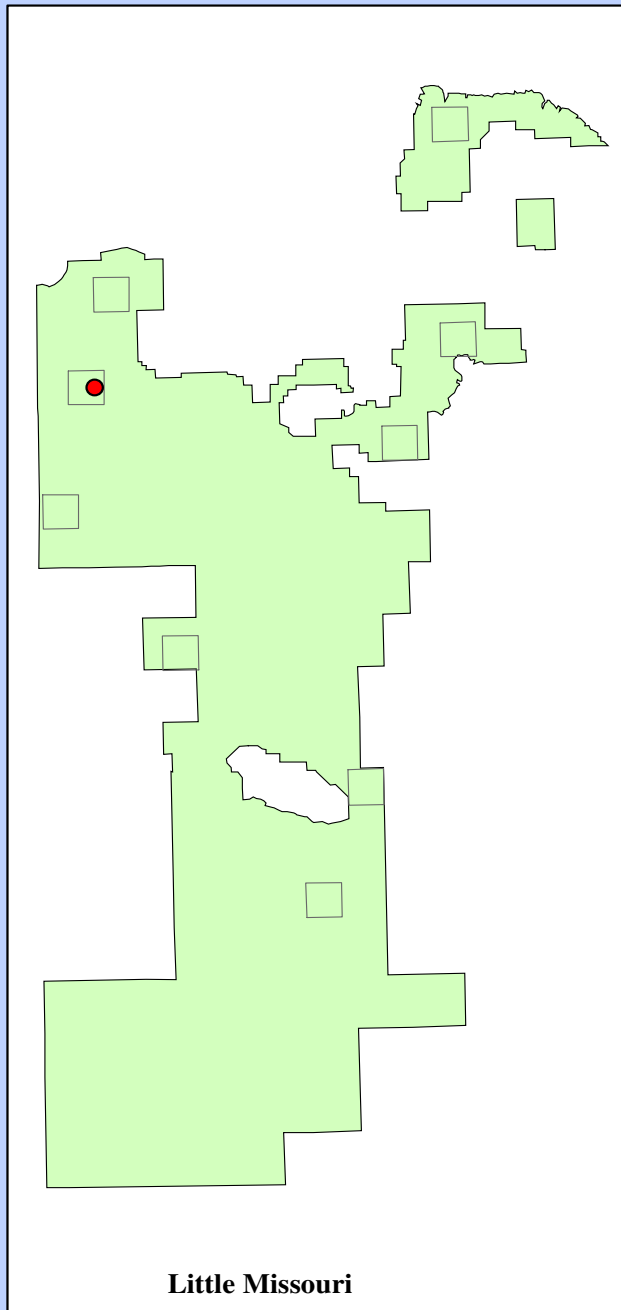



Legend

- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.10 - 0.29 | National Grassland Boundary |
| 0.30 - 0.60 | |

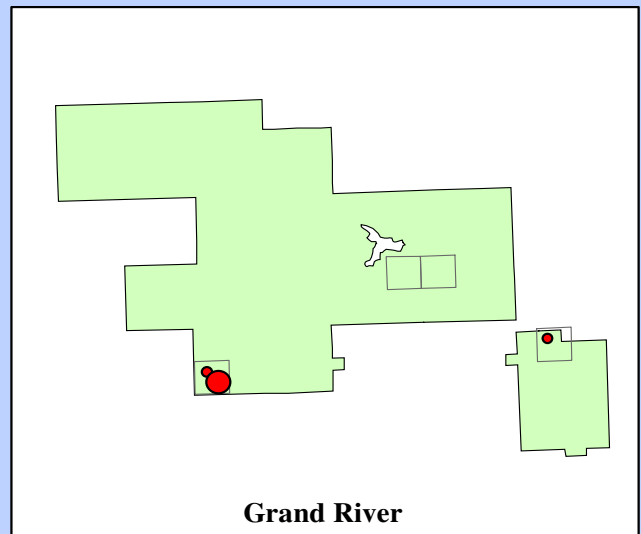
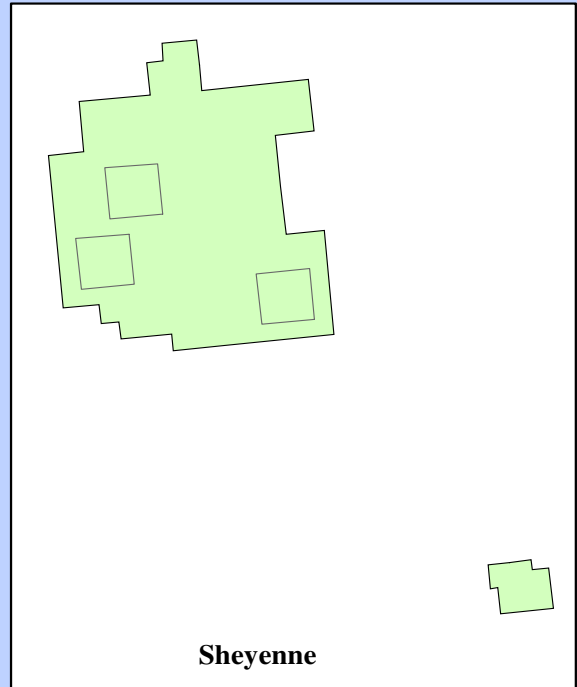
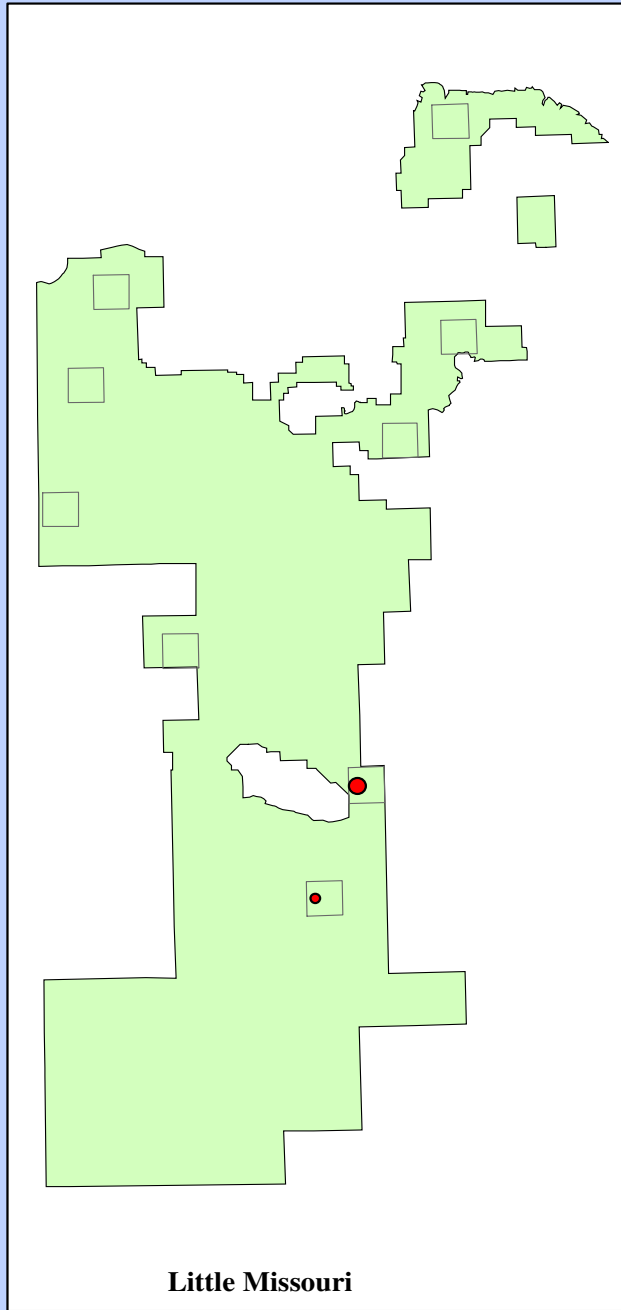


Le Conte's Sparrow



Legend		0 10 20 40 Miles		N ↑ ↓
Index of abundance	□ Survey Blocks			
● 0.13	■ National Grassland Boundary			

Chestnut-collared Longspur



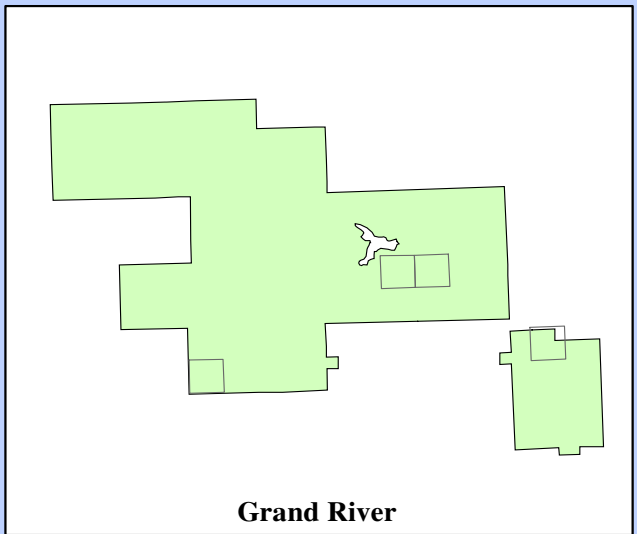
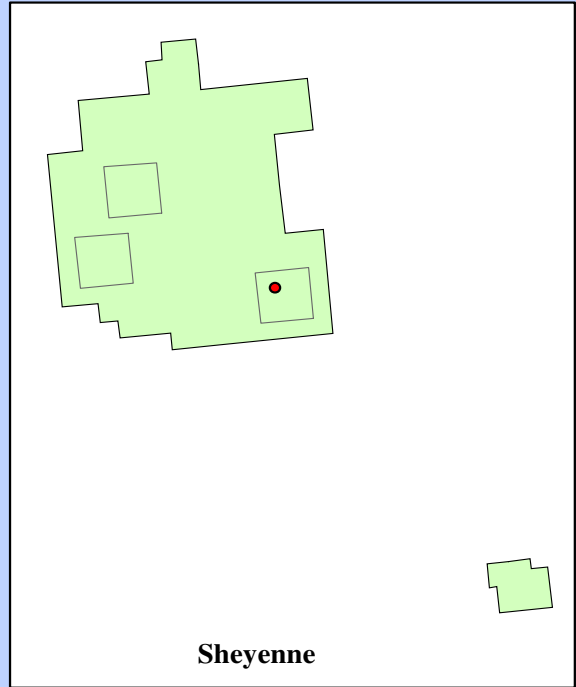
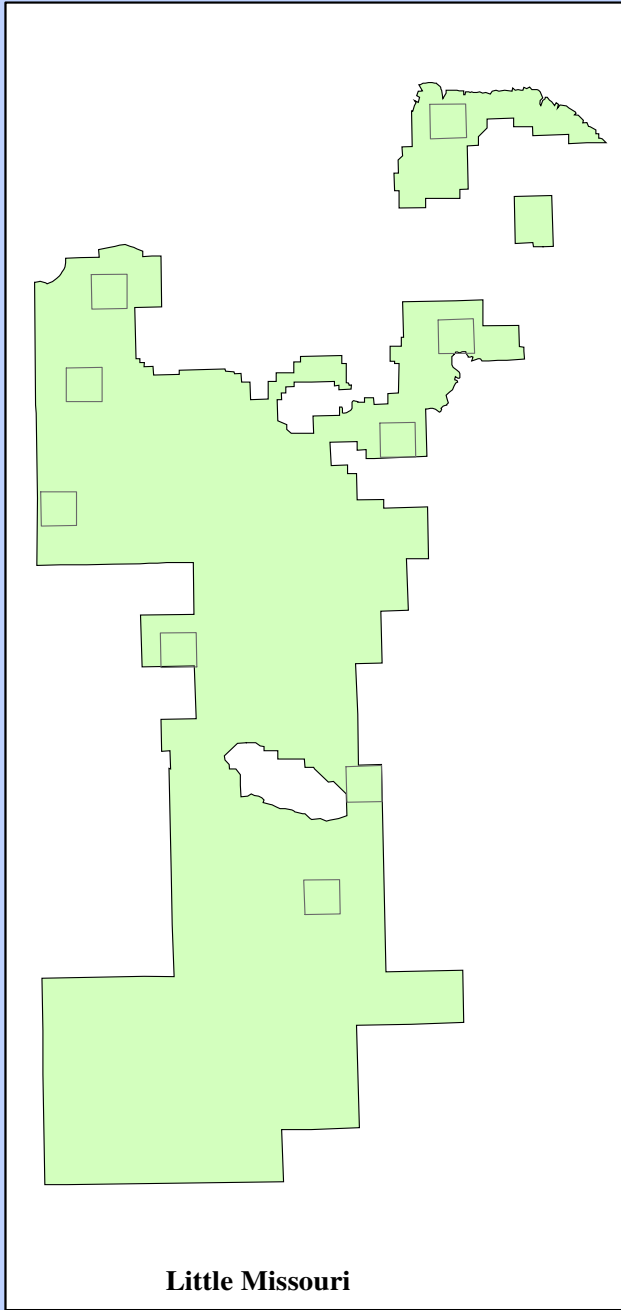
Legend

- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.13 - 0.25 | National Grassland Boundary |
| 0.26 - 0.60 | |
| 0.61 - 1.00 | |

0 10 20 40 Miles



Dickcissel



Legend




Index of abundance

- 0.13

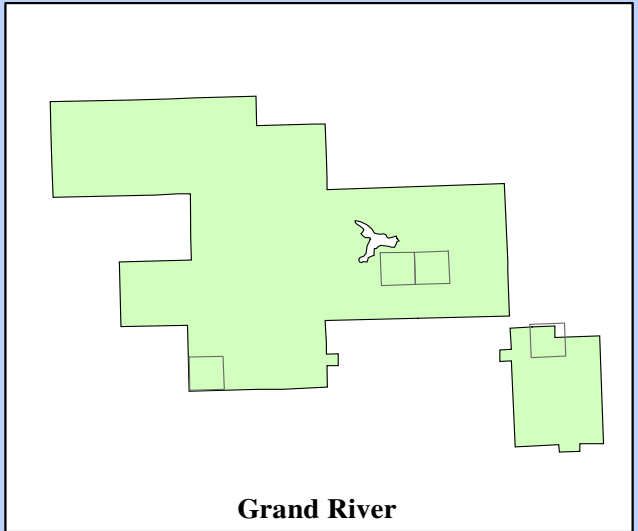
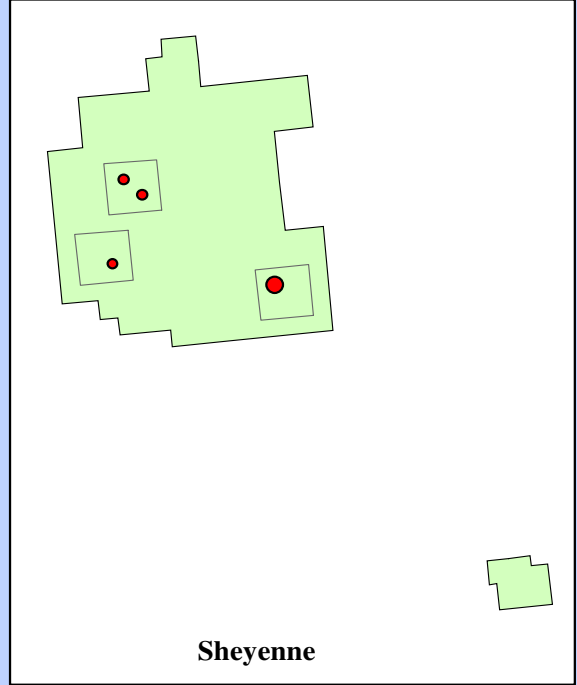
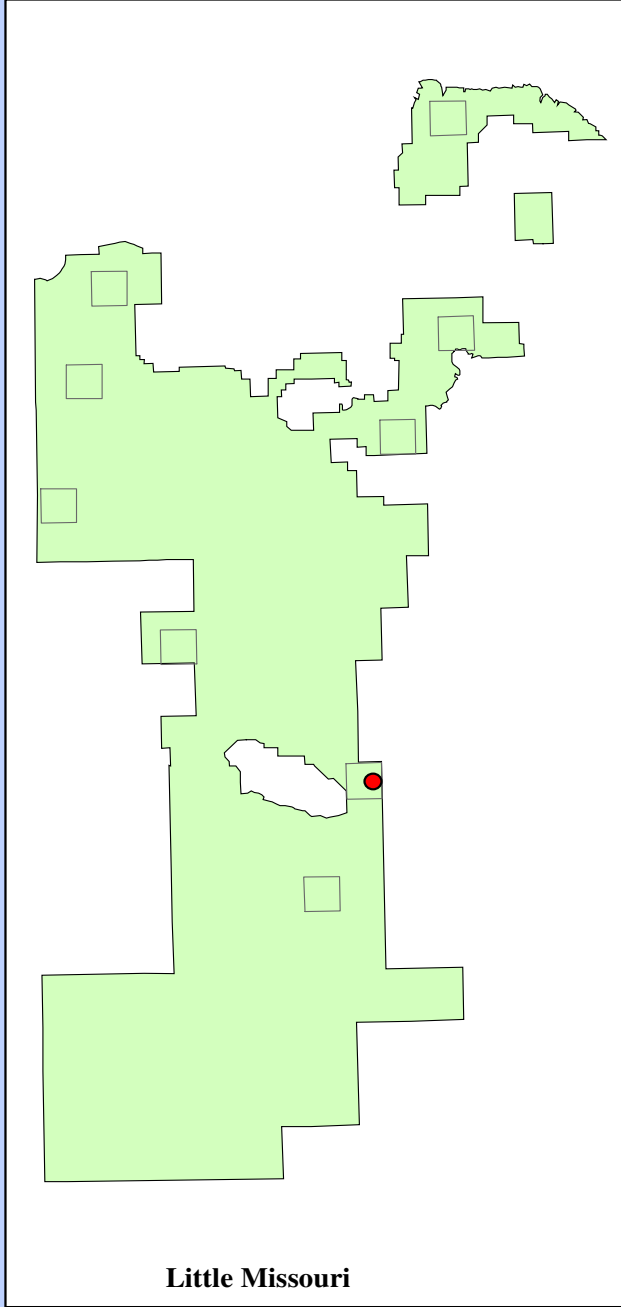
□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles



Bobolink



Legend

Index of abundance

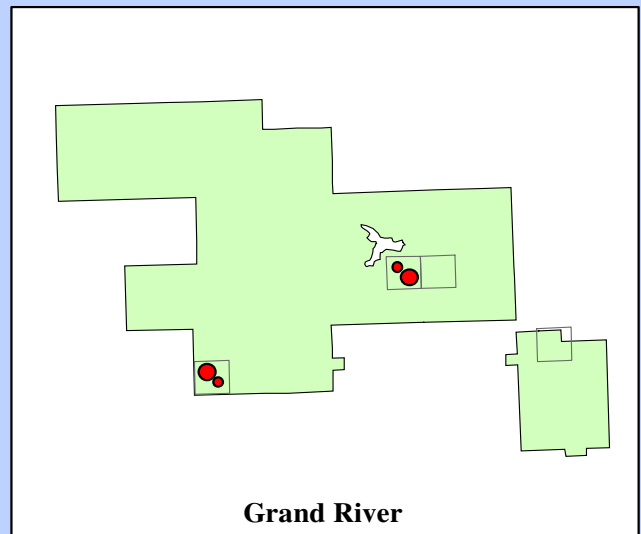
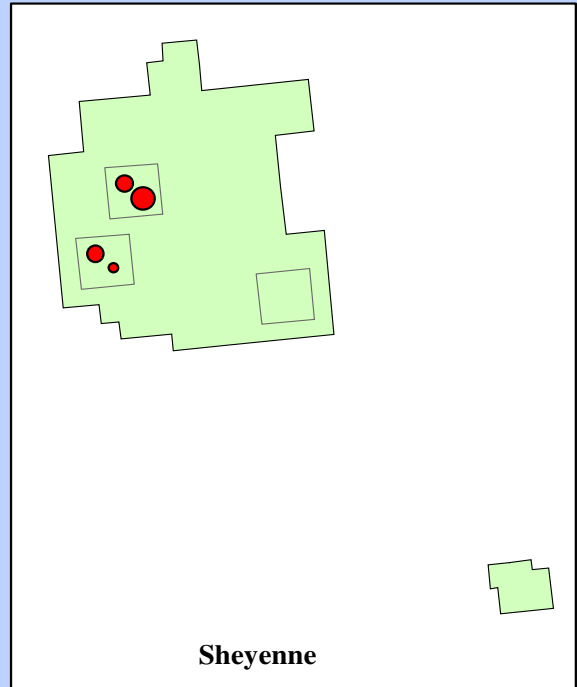
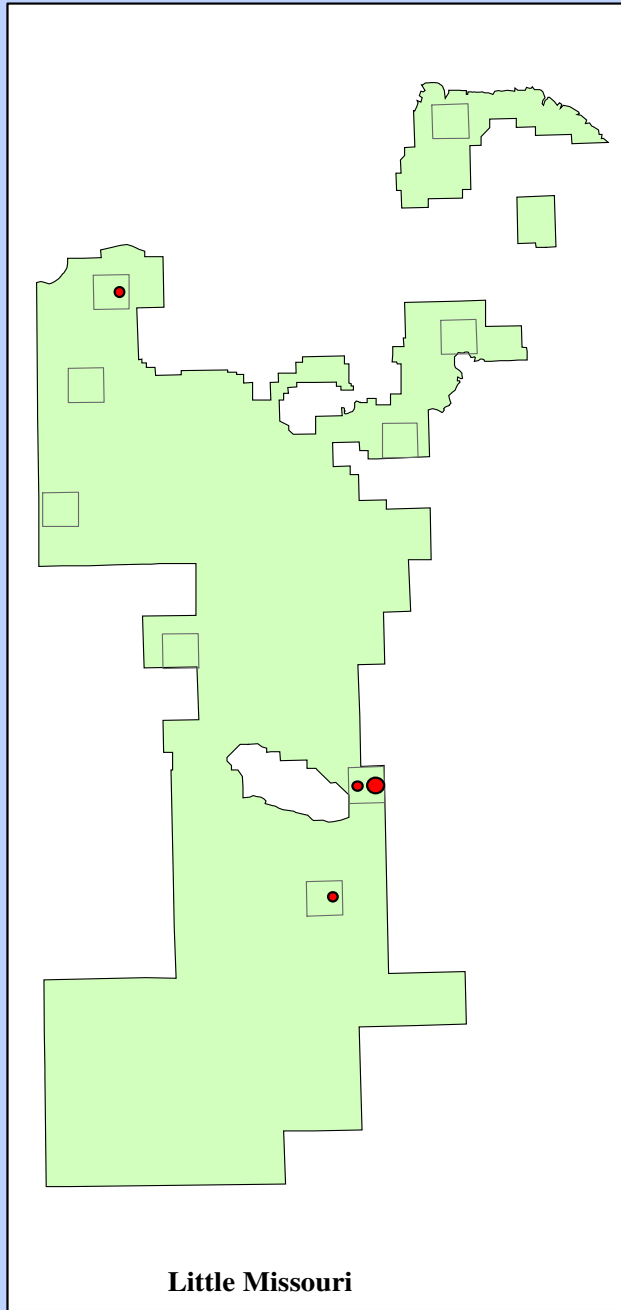
- 0.13 - 0.25
- 0.26 - 0.63

□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles

Red-winged Blackbird



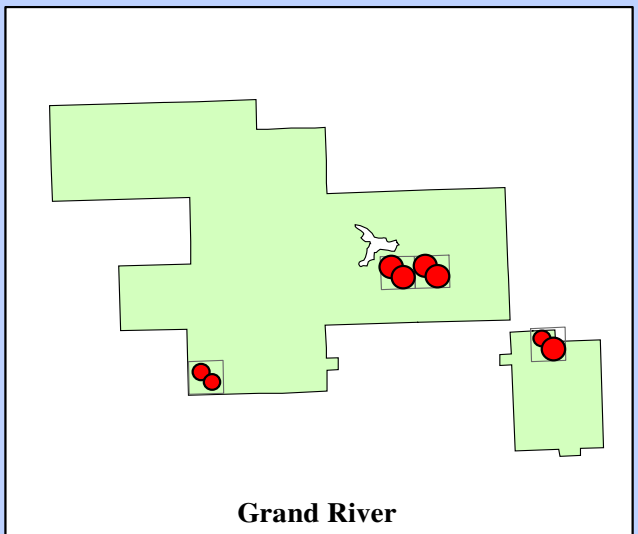
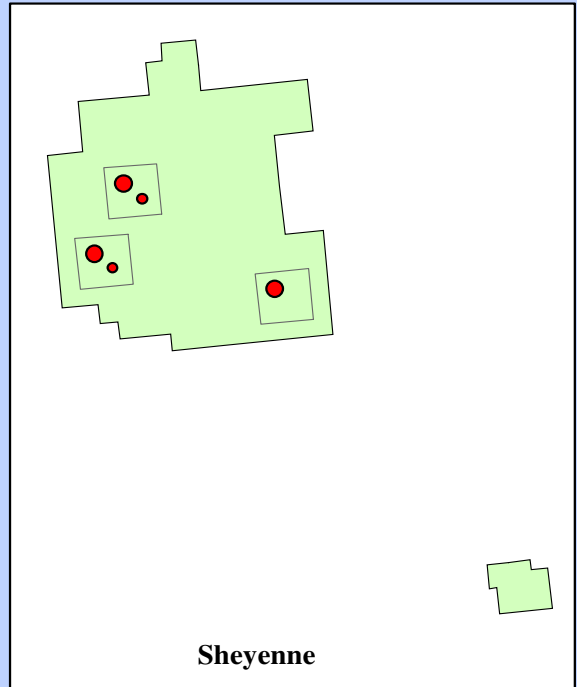
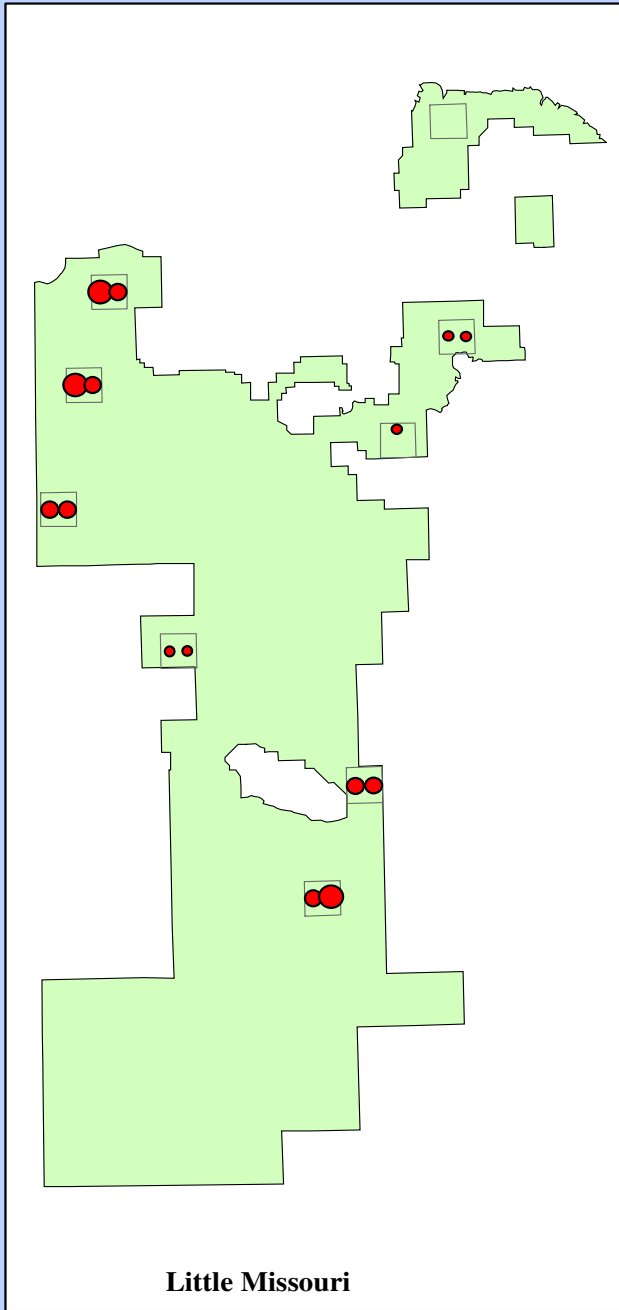
Legend

- | | |
|---------------------------|-----------------------------|
| Index of abundance | Survey Blocks |
| 0.10 - 0.38 | National Grassland Boundary |
| 0.39 - 1.00 | |
| 1.01 - 2.63 | |

0 10 20 40 Miles

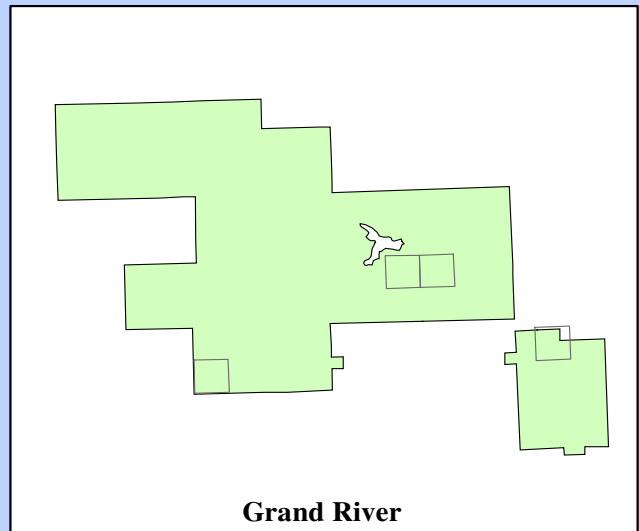
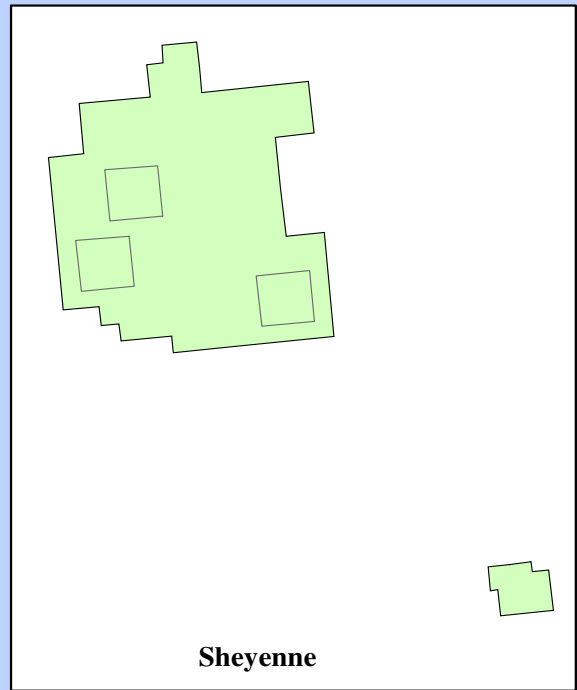
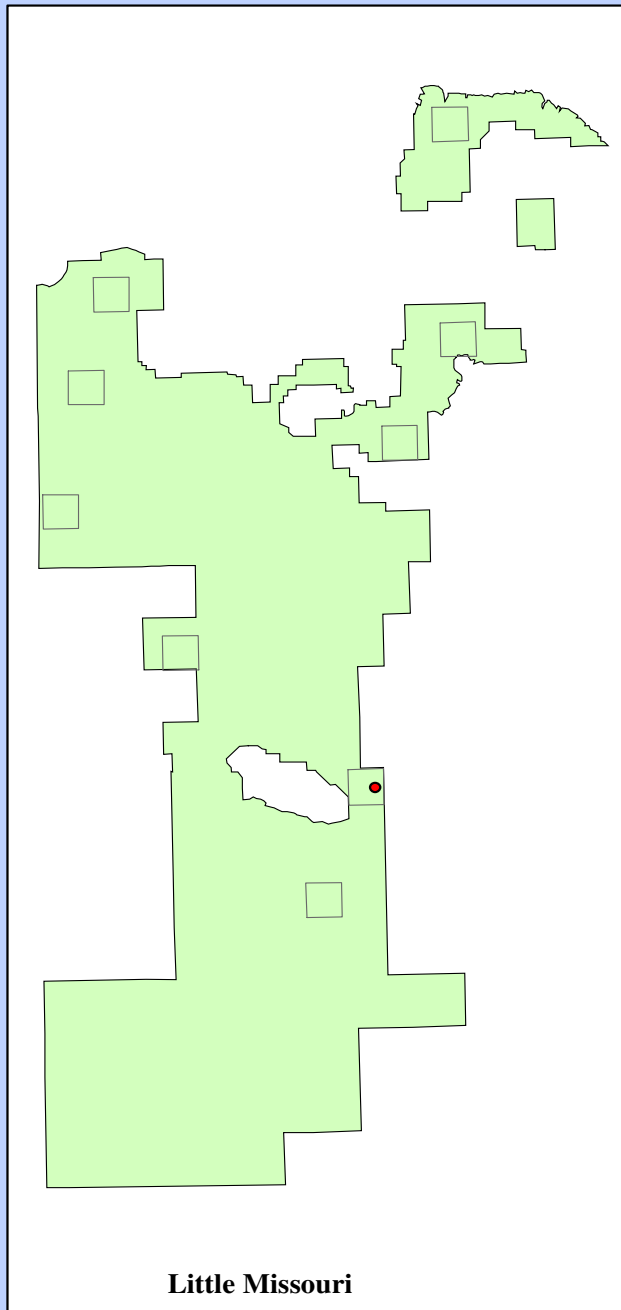


Western Meadowlark



Legend	
Index of abundance	Survey Blocks
0.13 - 0.75	National Grassland Boundary
0.76 - 2.00	
2.01 - 3.75	

Yellow-headed Blackbird



Legend




Index of abundance

- 0.40

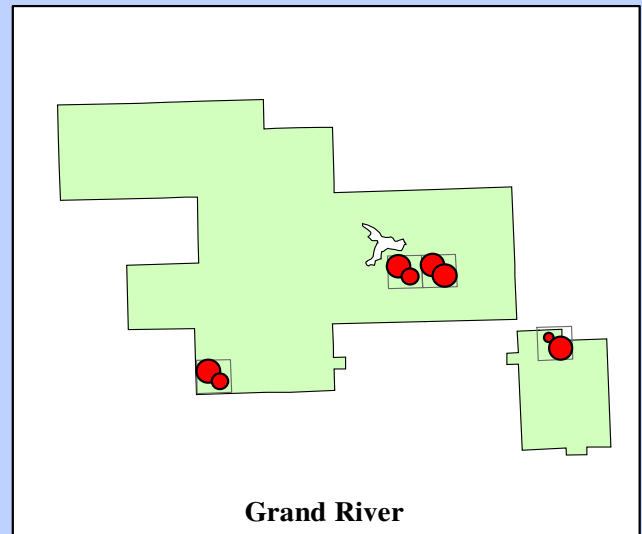
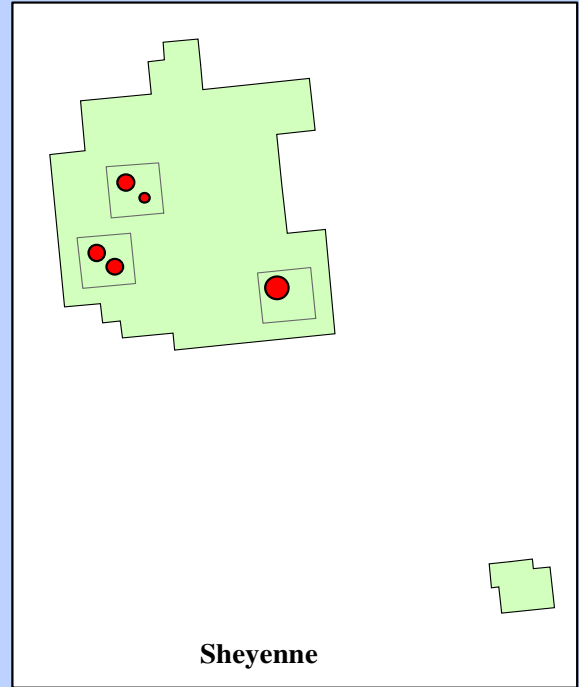
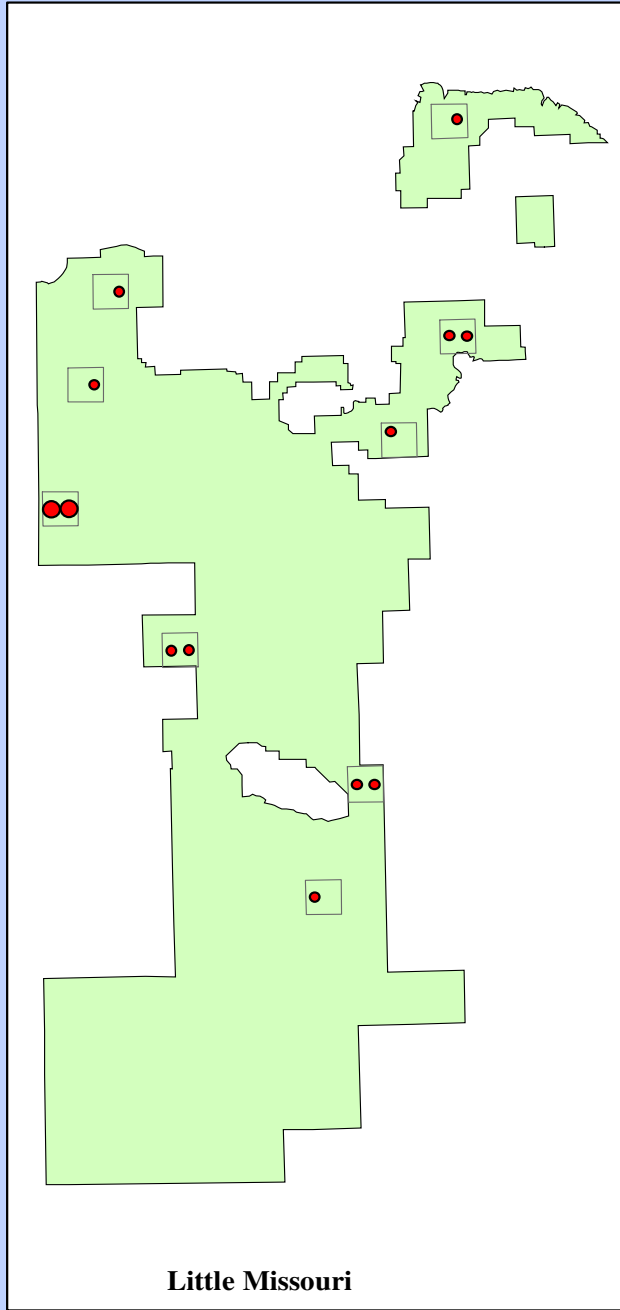
□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles



Brown-headed Cowbird



Legend

Index of abundance

- 0.10 - 0.57
- 0.58 - 1.13
- 1.14 - 1.88

□ Survey Blocks

■ National Grassland Boundary

0 10 20 40 Miles

N

APPENDIX B - Species List. A complete list of all species detected on Grand River, Little Missouri and Sheyenne National Grasslands with number of detections.

Common Name	2004			2004 Total	2005			2005 Total	2006			2006 Total	Grand Total
	Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		
Canada Goose		1	2	3		1	2	3					6
Wood Duck							1	1					1
Gadwall	4	2		6		4	4	8	2			2	16
American Wigeon										4		4	4
Mallard	3	2		5			3	3		1	1	2	10
Blue-winged Teal	2	2		4	2	1		3	2	2		4	11
Northern Shoveler		2		2		2	1	3					5
Northern Pintail	4			4									4
Canvasback						2		2					2
Common Merganser					1			1					1
Ruddy Duck						2		2		2		2	4
Gray Partridge										1		1	1
Ring-necked Pheasant	5	12	2	19		4	5	9			9	9	37
Sharp-tailed Grouse	2	2	2	6		4	1	5	1	2	2	5	16
Wild Turkey		1		1		1		1					2
Pied-billed Grebe		2		2						1		1	3
Eared Grebe						1		1		1		1	2
American White Pelican						1		1					1
Great Blue Heron	1			1									1
Great Egret											3	3	3

Common Name	2004			2004 Total	2005			2005 Total	2006			2006 Total	Grand Total
	Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		
Turkey Vulture						1		1		2		2	3
Northern Harrier	1	2		3	2	1		3		2		2	8
Swainson's Hawk					2			2	4	3		7	9
Red-tailed Hawk		5	1	6	2	12	1	15		6	6	12	33
Ferruginous Hawk			1	1	1			1	1			1	3
Crested Caracara										1		1	1
American Kestrel			1	1	1	1	2	4	1	5	2	8	13
Prairie Falcon		1		1		1		1					2
American Coot		1		1						1		1	2
Wilson's Plover		5		5									5
Killdeer	5	2	1	8	5	9	8	22	18	11	4	33	63
Willet						5		5		1		1	6
Spotted Sandpiper					1			1					1
Upland Sandpiper	50	13	13	76	20	7	15	42	62	24	15	101	219
Marbled Godwit		2	3	5		4	11	15	3			3	23
Wilson's Snipe			1	1		3	6	9					10
Common Snipe		1		1						1	4	5	6
Wilson's Phalarope						5	3	8		1		1	9
Red-necked Phalarope						3	1	4		1		1	5
Ring-billed Gull		1		1									1
Black Tern						1	1	2			10	10	12
Mourning Dove	21	11	8	40	15	13	26	54	20	39	20	79	173
Great Horned Owl							1	1					1

Common Name	2004			2004 Total	2005			2005 Total	2006			2006 Total	Grand Total
	Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		
Northern Pygmy-Owl					1			1					1
Burrowing Owl					1			1					1
Short-eared Owl										1	1		1
Common Nighthawk	6	6	2	14	1	2		3	3	8		11	28
Red-headed Woodpecker			1	1									1
Yellow-bellied Sapsucker						1		1					1
Downy Woodpecker						1		1	1	1	9	11	12
Hairy Woodpecker			1	1			1	1					2
Northern Flicker	3	3	2	8	4	4	4	12	4	20	16	40	60
Western Wood-Pewee		2		2									2
Eastern Wood-Pewee		1	2	3			1	1			2	2	6
Willow Flycatcher			6	6					3	1		4	10
Least Flycatcher	2	1	6	9		3	7	10			4	4	23
Eastern Phoebe							1	1					1
Say's Phoebe		3		3		3		3					6
Cassin's Kingbird										1		1	1
Western Kingbird	6	4		10	2	11	1	14	4	4		8	32
Eastern Kingbird	14	14	5	33	2	7	24	33	4	14	16	34	100
Loggerhead Shrike		2		2	1			1		1		1	4
Warbling Vireo		1		1			6	6					7
Red-eyed Vireo		7		7		18	1	19		18		18	44
Blue Jay							3	3			3	3	6
Black-billed Magpie		1		1		2		2		1		1	4

Common Name	2004			2004 Total	2005			2005 Total	2006			2006 Total	Grand Total
	Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		
American Crow		11		11		31	3	34		17	1	18	63
Common Raven		2		2									2
Horned Lark	23	7		30	29	18		47	75	42	2	119	196
Tree Swallow			2	2		1	1	2					4
Northern Rough-winged Swallow	1	1		2	4		1	5	2			2	9
Bank Swallow					1			1	1			1	2
Cliff Swallow	1			1			1	1	4	1	2	7	9
Barn Swallow	1	2		3		9		9		9		9	21
Black-capped Chickadee		2		2		3		3		15	1	16	21
Rock Wren		5		5	5	5		10	4	16		20	35
Bewick's Wren											6	6	6
House Wren		10	2	12		21	1	22	1	52	11	64	98
Sedge Wren											46	46	46
Marsh Wren											3	3	3
Eastern Bluebird		6	1	7		1		1		1	5	6	14
Western Bluebird						1		1					1
Mountain Bluebird		7		7		11		11		17		17	35
American Robin		2	3	5		13	3	16	2		2	4	25
Gray Catbird						2		2		6		6	8
Brown Thrasher	1		1	2			2	2	1	3	6	10	14
European Starling		3		3		1	1	2	1			1	6
Sprague's Pipit	6	24		30	38	87		125	10	16		26	181

Common Name	2004			2004 Total	2005			2005 Total	2006			2006 Total	Grand Total
	Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		
Cedar Waxwing		2		2		4	1	5					7
Blue-winged Warbler		3		3		5		5					8
Yellow Warbler	1	31	7	39		53	8	61	8	60	6	74	174
Black-and-white Warbler										10		10	10
American Redstart		3		3		5		5		4		4	12
Ovenbird		6	2	8		18		18		12		12	38
Common Yellowthroat		4	13	17		4	22	26	1	4	39	44	87
Yellow-breasted Chat		19		19		27	1	28		63	1	64	111
Spotted Towhee		60		60		55		55	1	179		180	295
Cassin's Sparrow						4		4					4
American Tree Sparrow		3		3									3
Chipping Sparrow		5		5	3	14	1	18		18	1	19	42
Clay-colored Sparrow			21	21		23	36	59		21	25	46	126
Brewer's Sparrow		1		1									1
Field Sparrow	1	9	5	15		64	1	65		111	5	116	196
Vesper Sparrow	5	39	1	45	4	104	2	110		165	12	177	332
Lark Sparrow	3	9		12		4		4		23	3	26	42
Sage Sparrow							2	2					2
Lark Bunting	37	27		64	71	6		77	53	6		59	200
Savannah Sparrow		5	9	14		13	9	22		4	13	17	53
Grasshopper Sparrow	36	94	38	168	85	183	93	361	58	170	40	268	797
Baird's Sparrow		12		12	2	4	1	7		11		11	30
Le Conte's Sparrow		1		1									1

Common Name	2004			2004 Total	2005			2005 Total	2006			2006 Total	Grand Total
	Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		Grand River	Little Missouri	Sheyenne		
Song Sparrow			1	1			2	2			5	5	8
Chestnut-collared Longspur	11	7		18	13		1	14	8	19		27	59
Rose-breasted Grosbeak			1	1									1
Black-headed Grosbeak		5	1	6		2		2		1		1	9
Lazuli Bunting		3	1	4	5	4		9		5		5	18
Indigo Bunting		1		1									1
Dickcissel			1	1							32	32	33
Bobolink		4	12	16		1	42	43		14	15	29	88
Red-winged Blackbird	16	12	33	61	11	10	38	59	10	18	69	97	217
Eastern Meadowlark							32	32					32
Western Meadowlark	143	165	35	343	133	325	97	555	258	345	82	685	1583
Yellow-headed Blackbird		4		4		1		1	1	6	6	13	18
Brewer's Blackbird		2		2		1	4	5			1	1	8
Common Grackle	1	4		5			5	5	1	7	1	9	19
Brown-headed Cowbird	78	39	34	151	19	32	19	70	105	84	34	223	444
Orchard Oriole							2	2					2
Bullock's Oriole			3	3						2		2	5
Baltimore Oriole			2	2			4	4					6
American Goldfinch	3	3		6	1	11	3	15	3	9	12	24	45

